FLOOD INSURANCE STUDY

PORTER COUNTY, INDIANA
AND UNINCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BEVERLY SHORES, TOWN OF	185173
BURNS HARBOR, TOWN OF	180207
CHESTERTON, TOWN OF	180201
DUNE ACRES, TOWN OF	180205
HEBRON, TOWN OF	180387
*KOUTS, TOWN OF	180335
OGDEN DUNES, TOWN OF	180206
PINES, TOWN OF	180388
PORTAGE, CITY OF	180202
PORTER COUNTY UNINCORPORATED AREAS	180425
PORTER, TOWN OF	180208
VALPARAISO, CITY OF	180204

*NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED

PRELIMINARY:

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
18127CV000A

NOTICE TO FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Selected Flood Insurance Rate Map panels for this community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zone:	New Zone:
A1 through A30	AE
B	X (shaded)
C	X

Effective Date: To be determined

Revised Dates: Not Applicable

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FLOOD INSURANCE STUDY
PORTER COUNTY, INDIANA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and Flood Insurance Rate Maps (FIRMs) in the geographic area of Porter County, Indiana, including: the City of Portage, the City of Valparaiso, Town of Beverly Shores, Town of Burns Harbor, Town of Chesterton, Town of Dunes Acres, Town of Kouts, Town of Hebron, Town of Ogden Dunes, Town of Pines, Town of Porter and the unincorporated areas of Porter County (hereinafter referred to collectively as Porter County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. This information will also be used by Porter County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3. It was found that the Town of Kouts has no identified special flood hazard areas.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgements

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Information on the authority and acknowledgements for each of the new studies and previously printed FIS reports and Flood Insurance Rate Maps (FIRMs) for communities within Porter County was compiled and is shown below:

Porter County (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were performed by Clyde E. Williams and Associates, Inc., for the Federal Insurance Administration, under Contract No. H-4775. That work was completed in February 1980. (Reference 1)

Valparaiso, City of (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were taken from the work prepared for the Unincorporated Areas of Porter County flood Insurance Study (Reference 1). That work was completed in February 1980.

Chesterton, Town of (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were performed by U.S. Army Corps of Engineers, Chicago District, for the Federal Insurance Administration under Inter-Agency Agreement No. IAA-H-7-76, Project Order No. 19. That work was completed in July 1977, including all significant flooding sources in the Town of Chesterton.

Beverly Shores, Town of (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were performed by the Soil Conservation Service of the U.S. Department of Agriculture, in accordance with Project Order No. 16, effective May 1, 1972, under HUD-SCS Agreement IAA-H-16-72, signed July 21, 1971.

Burns Harbor, Town of (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were performed by Harza Engineering Company, for the Federal Insurance Administration, under Contract No. H-4803. That work was completed in May 1979.

Porter, Town of (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were performed by U.S. Geological Survey, Water Resources Division, for the Federal Insurance Administration, under Contract No. IAA-H-17-75, Project Order No. 14. That work was completed in September 1977.

Portage, City of (Unincorporated Areas): The hydrologic and hydraulic analyses for this study were performed by U.S. Army corps of Engineers, Chicago

District, for the Federal Emergency Management Agency, under Contract No. IAA-H-7-76, Project Order No. 19. That work was completed in August 1978.

Redelineation of the previously effective flood hazard information for this FIS report, correction to the North American Vertical Datum of 1988, and conversion of the unincorporated and incorporated areas of Porter County was performed by Lawson Fisher and Associates on behalf of the Indiana Department of Natural Resources. The Indiana Department of Natural Resources managed the production of this study as part of their Cooperating Technical Partner agreement with the Federal Emergency Management Agency dated April 29, 2004, which was defined by the Indiana DNR Mapping Activity Statement 05-11 dated June 23, 2005.

1.3 Coordination

The purpose of an initial Consultation Coordinated Officer's (CCO's) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study. The dates of the initial and final CCO meetings held for the previously effective FIS reports covering the geographic area of Porter County, Indiana are shown in Table 1. The initial and final CCO meetings were attended by the study contractor, FEMA (or the Federal Insurance Administration), the Indiana Department of Natural Resources (IDNR), and the affected communities.

Table 1: CCO Meeting Dates for Pre-Countywide FIS

Community Name	Initial CCO Date	Final CCO Date
Porter County	May 1978	April 6, 1981
Valparaiso, City of	May 1978	February 18, 1982
Chesterton, Town of	January 1976	May 16, 1978
Porter, Town of	January 1975	October 23, 1978
Portage, City of	January 1976	April 16, 1981
Beverly Shores, Town of	*	*
Burns Harbor, Town of	November 3, 1978	May 21, 1980

*Data not available

For this countywide FIS, an initial CCO meeting was held on March 23, 2005, and was attended by the Indiana Department of Natural Resources (IDNR), the Federal Emergency Management Agency (FEMA), representatives of Porter County, the Towns of Hebron and Porter, as well as the Cities of Portage and Valparaiso.

The results of the countywide study were reviewed at the final CCO meeting held --- on , attended by representatives of FEMA, IDNR, and representatives from incorporated communities, and unincorporated areas of Porter County. All problems raised at that meeting were addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Porter County, Indiana, including the incorporated communities listed in Section 1.1.

All FIRM panels for Porter County have been revised, updated, and republished in countywide format as a part of this FIS. The FIRM panel index, provided as Exhibit 2, illustrates the revised FIRM panel layout.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards as identified during the initial CCO meeting. For this study, new stream reaches studied using approximate methods include, Coffee Creek and Unnamed Tributary West Branch Crooked Creek. The scope and methods of new approximate studies were proposed and agreed upon by FEMA, IDNR, and Porter County.

Streams studied by detailed methods include Salt Creek, Frog Creek, Duck Creek, and Robbins Ditch.

This FIS update also incorporates the determination of letters issued by FEMA resulting in map changes (Letters of Map Change, or LOMC's). All Letters of Map Revision (LOMR's) incorporated into the mapped changes are summarized in Table 2. Letters of Map Amendment (LOMA's) incorporated for this study are summarized in the Summary of Map Actions (SOMA) included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the TSDN may be obtained from the Community Map Repository.

Table 2: Incorporated Letters of Map Change

Flooding Source	Community and Project ID	Date Issued	Type
Peterson Ditch	180201 / 95-05-283P	May 21, 1996	102 BFE change
Sand Creek	180201 / 98-05-279P	March 3, 1999	102 BFE change

Table 3: Streams Studied by Detailed Methods from Prior Studies

Burns Waterway	Coffee Creek
Crisman Ditch	East Arm Little Calumet River
Kankakee River	Lenburgh Ditch
Little Calumet River	Peterson Ditch
Sand Creek	Willow Creek

Table 4: Streams Studied by Approximate Methods from Prior Studies

Brown Ditch	Carver Ditch
Clark Ditch	Coffee Creek
Crooked Creek	Damon Run
Deep River	Duck Creek
Dunes Creek	East Arm Little Calumet River
Gustafson Ditch	Kankakee River
O'Connor Creek	Peregrine Ditch
Pleasant Township Ditch	Salt Creek
Sandy Hook Ditch	

Table 5: Scope of Study

Flooding Source	Limits of Detailed Study
Frog Creek	Lake County Line to County Road 625 West
Duck Creek	Lake-Porter County Line to County Road 450 North
Robbins Ditch	Central Avenue to Robbins Road
Salt Creek	Mouth to County Road 150 East
Flooding Source	**Limits of Redelineation Study**
n/a	n/a
Flooding Source	**Limits of Approximate Study**
Coffee Creek	County Road 1100 North to County Road 200 East
UNT West Branch Crooked Creek	Flint Lake Outlet to State Road 49

2.2 Community Description

Porter County is located in the northwestern part of Indiana bordering Lake Michigan. It is bordered by LaPorte County to the east, Jasper County to the south, Starke County to the southeast, Newton County to the southwest and Lake County to the west. Porter County is located about 140 miles north of Indianapolis, about 40 miles east of Chicago, and about 120 miles northwest of Fort Wayne. Porter County is served by Interstates 80/90, U.S. Highway 31, and many State and County roads. According to the Indiana Business Research Center, the 2006 population of Porter County was 160,105.

The Valparaiso Moraine extends across the county in a north and northeasterly direction and divides the drainage areas north and south. South and east of the moraine are nearly level to gently sloping soils that drain south into the Kankakee River. The gently sloping to steep soils of the moraine is well dissected by small drainage ways. North of the moraine are lacustrine or sandy, nearly level to steep soils that drain north into Lake Michigan. Elevation of the land ranges from about 585 feet on the shore of Lake Michigan to about 888 feet above sea level.

Climate data for the 30-year period of 1971-2000 are available from the National Oceanic and Atmospheric Administration (NOAA). Porter County (Valparaiso) average annual temperature is 49.8 degrees Fahrenheit (F), with average monthly temperatures ranging from 22.9 degrees F in January to 73.0 degrees F in July. The annual precipitation average is 40.06 inches a year, with the wettest month being June, averaging 4.66 inches.

The City of Valparaiso is located in central Porter County and is the county seat of government. The city is located at the intersection of US 30 and SR 2. The 2005 population of Valparaiso was 29,102.

The City of Portage is located in northwest Porter County. Portage is located along I-94 and I-80/90. The 2005 population of Portage was 35,687.

The Town of Beverly Shores is located in northeast Porter County. The 2005 population of Beverly Shores was 711.

The Town of Burns Harbor is located in northwest Porter County. The town is located at the intersection of US 12 and SR 149. The 2005 population of Burns Harbor was 820.

The Town of Chesterton is located in northern Porter County. The town straddles I-94. The 2005 population of Chesterton was 12,032.

The Town of Dune Acres is located in northern Porter County. The town is located on along Lake Michigan just west of SR 49. The 2005 population of Dune Acres was 222.

The Town of Hebron is located in southwestern Porter County. The town is located at the intersection of US 231 and SR 8. The 2005 population of Hebron was 3570.

The Town of Kouts is located in southern Porter County. The 2005 population of Kouts was 1,766.

The Town of Ogden Dunes is located in northwestern Porter County. The town is located along Lake Michigan and north of US 12. The 2005 population of Ogden Dunes was 1,275.

The Town of Porter is located in northern Porter County. The town is located west of SR 49 and straddles I-94. The 2005 population of Porter was 5,217.

The Town of Pines is located in northeastern Porter County. The town is located on US 12 and US 20. The 2005 population of Pines was 793.

2.3 Principal Flood Problems

Major flooding in Porter County primarily occurs along the Kankakee River and its tributaries. Recession of flooding is much slower; often weeks elapse before the river return to normal flow. Nearly all yearly maximum flows on the Kankakee River occur during the spring, generally April and May, but can occur during any season. The worst floods in recent history occurred in 1950, 1954 and 1968. Continuous flooding that prevented farmers along the Kankakee River from planting crops in many areas occurred from December 24, 1949 to May 15, 1950 and June 15 to June 27, 1950. An October 9 to November 15, 1954 flood caused extensive damage to unharvested crops.

2.4 Flood Protection Measures

Within the study areas of the county, there are no National Flood Insurance Program recognized flood control structures to provide protection from the effects of a 1% annual chance flood event. There are, however, numerous structures in the areas studied which could have significant effects on the floods of lower magnitudes.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in Porter County, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. The analyses reported here reflect current conditions in the drainage areas of the stream. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year.

The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analysis

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the county.

Precountywide Analysis

For the Kankakee River, flood flow frequency data were obtained by a regional gage analysis of the three stream gages listed below:

Little Calumet River at Porter, IN (62.20 square miles – 61 years of record).
Burns ditch at Portage, IN (331 square miles – 3 years of record).
Kankakee River at Dunns Bridge, IN (1352 square miles – 58 years of record).

In the regional analysis, flows were weighted according to the number of years of record and then extrapolated from the best-fit lines in order to develop the flood flow frequency data. All flow values were submitted to the DNR for review.

Records for all gages were adjusted or extended to cover the period 1902-1974. A log-Pearson type III analysis then provided flows for selected recurrence intervals at all gages. The analysis was completed by the Michigan Department of Natural Resources and coordinated with the Indiana Department of Natural Resources, the U.S. Army Corps of Engineers and Johnson & Anderson, Inc.

Peak discharges for the East Arm Little Calumet River, Sand Creek, Coffee Creek and Peterson Ditch were based on a HEC-1 rainfall-runoff computer model of the East Arm's drainage basin. The HEC-1 model, previously prepared for a Flood Plain Information Study which included the East Arm Little Calumet River and Coffee Creek, was expanded to include Sand Creek and Peterson Ditch. The results of the HEC-1 model on Salt Creek were checked with a statistical analysis of the 31 years of stage discharge records at the McCool gage station located near river mile 1.5.

Six-hour increments of a 24-hour storm rainfall, corresponding to frequencies of 10, 50, and 100-years were obtained from U.S. Weather Bureau Technical Paper No. 40. Rainfall values for the 500-year storm were then extrapolated from values for the lower frequencies. Sets of these rainfall increments were entered into the HEC-1 model, in critical order, to obtain peak discharges for the 10-, 50-, 100-, and 500-year floods. Peak

discharges for Peterson Ditch were adjusted to reflect over-bank storage. This was accomplished by Modified Puls reservoir routings of the synthetic hydrographs obtained from the HEC-1 model.

A HEC-1 computer model was also used to obtain peak discharges for the Willow Creek basin. This model includes Crisman Ditch, Lenburg Ditch, as well as Willow Creek.

Peak discharges for the Little Calumet River were based on a statistical analysis of the stream gage at Gary, based on Technical Release Bulletin No. 17.

Peak discharges on Burns Waterway were obtained by adding the translated discharge for the Little Calumet River at Burns Waterway to the HEC-1 discharge for the East Arm Little Calumet River occurring 10 hours after peaking at Burns Waterway. The 10 hour lag is based on storm hydrographs for the locations given in the Hydrologic Report Little Calumet River and Tributaries.

When the water surface on Lake Michigan rises due to high water and wind setup effect, water backs up along Burns Waterway until in reaches lake elevation. The 1% chance elevation for part of Burns Waterway will be the same as the 1% chance elevation for high water on the East Chicago shore of Lake Michigan since these elevations are higher than those computed using the HEC-1 rainfall-runoff model. Wave run up caused by storm waves meeting the shore in not included in the open-coast flood elevations shown in Table 8.

Countywide Analysis

Information on the methods used to determine peak discharge-frequency relationships for the streams restudied as part of this countywide FIS is shown below.

The equations used to determine the discharges in the majority of the cases are taken from Estimation of Peak Discharges of Indiana Streams by using log Pearson (iii) distribution. The equations presented in the report are also included in the latest version of the National Flood Frequency (NFF) program by the USGS, and are included in the USGS StreamStats application. In some cases, the discharges for a stream have been coordinated with the Indiana Department of Natural Resources, the Natural Resources Conservation Service (formally the Soil Conservation Service), the U.S. Geological Survey and the U.S. Army Corps of Engineers, through a Memorandum of Understanding dated May 6, 1976.

For Robbins Ditch, a HEC-1 model was developed to determine peak discharges upstream of the existing coordinated discharge values for the pre-countywide study. Frog Creek and Duck Creek peak discharges were taken from the coordinated discharge graph for tributaries to Deep River/Turkey Creek in Lake County. Salt Creek peak discharges were taken from the coordinated discharge graph for Salt Creek in Porter County.

Table 6: Summary of Discharges, Pre-Countywide

Flooding Source And Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
BURNS WATERWAY					
At Lake Michigan	331.0	6,210	9,800	10,600	16,000
COFFEE CREEK					
At Mouth	15.9	1,125	1,605	1,760	2,170
At Conrail	15.1	1,095	1,565	1,715	2,115
At Porter Avenue	14.8	1,085	1,550	1,700	2,095
CRISMAN DITCH					
At Mouth	1.1	200	285	325	415
EAST ARM LITTLE CALUMET RIVER					
At Mouth	151.0	4,050	6,150	6,760	8,480
At Cross Section D	148.6	3,990	6,090	6,690	8,450
Above Salt Creek	71.5	2,340	3,380	3,660	4,510
USGS Gage at Porter	66.2	2,335	3,360	3,620	4,415
Below Confluence with Coffee Creek	48.3	1,720	2,440	2,640	3,260
KANKAKEE RIVER					
At Dunn's Bridge	1,160.0	4,500	5,500	6,100	N/A
LENBURG DITCH					
At Mouth	1.3	85	120	140	175
LITTLE CALUMET RIVER					
Above East Arm Little Calumet River	179.0	3,230	4,600	5,190	6,600
Above Willow Creek	166.0	3,000	4,260	4,800	6,120
Western Corporate Limit	70.0	2,400	3,480	3,760	4,580
Mineral Springs Road	66.2	2,340	3,360	3,620	4,420
PETERSON DITCH					
At Mouth	2.8	150	270	340	490
Above Interstate-94	2.2	128	230	290	430
At 23rd Street	1.5	85	175	225	360
23rd Street (mile 2.07)	1.4	57	115	120	250

Table 6: Summary of Discharges, Pre-Countywide (continued)

Flooding Source And Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
SAND CREEK					
At Mouth	5.0	320	450	495	610
At Conrail	4.4	300	420	465	575
WILLOW CREEK					
At Mouth	9.2	795	1,120	1,300	1,620
Above Crisman Ditch	6.4	645	910	1,050	1,310
Above Lenburg Ditch	4.3	400	565	650	820

A summary of the drainage area peak discharge relationships for all the streams studied by detailed methods for this countywide FIS is shown in Table 7.

Table 7: Summary of Discharges, Countywide

Flooding Source And Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
SALT CREEK					
At Mouth	77.1	N/A	N/A	3,400	4,700
Near McCool USGS gage	74.6	N/A	N/A	3,250	4,500
Above Squirrel Creek	63.9	N/A	N/A	2,900	4,000
Above Damon Run	51.0	N/A	N/A	2,480	3,400
At 500 North Road	43.2	N/A	N/A	2,200	3,050
At State Road 130	36.5	N/A	N/A	1,950	2,700
U/S UNT Salt Creek	33.0	N/A	N/A	1,800	2,520
Above Clark Ditch	24.3	N/A	N/A	1,420	1,960
D/S of Corp. Limits of Valparaiso at Joliet St.	20.0	N/A	N/A	1,230	1,700
At Valparaiso WWTP	16.5	N/A	N/A	1,075	1,480
At U.S 30	14.9	N/A	N/A	1,000	1,380
Above Sagers Lake Outlet	7.8	N/A	N/A	620	850
At State Road 2	6.5	N/A	N/A	550	760
At Division Road	4.8	N/A	N/A	440	607

Table 7: Summary of Discharges, Countywide (continued)

Flooding Source And Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
FROG CREEK					
At County Line Road	3.1	N/A	N/A	338	466
DUCK CREEK					
At County Line Road	2.3	N/A	N/A	458	688
U/S Peregrine Ditch	1.3	N/A	N/A	241	359
ROBBINS DITCH					
At Mouth	2.7	73	199	294	N/A
N&W Railroad	2.5	209	433	490	N/A
B&O Railroad	2.3	305	431	489	1,004
Upstream of Toll Road	2.0	392	639	746	1,004
U/S of Unnamed Tributary 200 ft south of Central Ave	1.8	N/A	N/A	600	810

3.2 Hydraulic Analysis

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Cross sections were determined from topographic maps and field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM. All topographic mapping used to determine cross-sections are referenced in Section 4.1.

Predicted Stillwater elevations for open-coast flood levels for Lake Michigan are listed with this FIS update (Table 8). These levels were developed by the USACE, and were recorded in the 1988 revised report on open-coast flood levels (Reference 15). These levels are based on an analysis of the maximum instantaneous levels recorded each year for the period of record adjusted to present diversion and outlet conditions at federal government water level gaging stations in Canada and the United States. The levels have

been adjusted to reflect the change to the North American Vertical Datum of 1988 for Porter County.

Table 8: Stillwater Elevations (USACE Lake Michigan Open-Coast Flood Levels)

Probability of Exceedance	Lake Michigan Elevation (Feet NAVD 88*)
Predicted 10%-Annual –Chance Lake Level	583.2
Predicted 2%-Annual –Chance Lake Level	584.3
Predicted 1%-Annual –Chance Lake Level	584.7
Predicted 0.2%-Annual –Chance Lake Level	585.6
*North American Vertical Datum 1988	

Pre-countywide Analysis

The City of Valparaiso, the City of Portage, the Town of Chesterton, the Town of Dune Acres, the Town of Porter, and the unincorporated areas of Porter County have a previously printed FIS report. Cross sections used in the countywide analysis were obtained from field survey and existing HEC-2 Pre-Countywide FIS models. The hydraulic analyses described in those reports have been compiled and are summarized below.

The HEC-2 computer program developed by the USACE was used to compute water-surface profiles (USACE, 1991).

Roughness coefficients (Manning's "n" values) were chosen based on field inspection of the streams and flood plain areas and from model calibrations based on high water marks. The range in values of roughness used in the report is presented in Table 9: Channel and Overbank Roughness Factors, Pre-countywide FIS

Table 9: Channel and Overbank Roughness Factors, Pre-countywide FIS

Stream	Channel "n"	Overbank "n"
Burns Waterway	0.035 – 0.037	0.070
Coffee Creek	0.040-0.050	0.080
Crisman Creek	0.022 – 0.060	0.040 – 0.10
Kankakee River	0.036 – 0.070	0.080 – 0.140
Lenburg Ditch	0.040 – 0.080	0.070 – 0.10
Little Calumet River	0.035 – 0.037	0.070
East Arm Little Calumet River	0.050 – 0.055	0.090
Peterson Ditch	0.025 – 0.050	0.040 – 0.200
Sand Creek	0.035 – 0.040	0.080 – 0.110
Willow Creek	0.015 – 0.055	0.040 – 0.100

Flood profiles were prepared for all streams studied by detailed methods and show computed water-surface elevations to an accuracy of 0.5 feet for floods of the selected recurrence intervals (Exhibit 1). Starting water-surface elevations for the computer runs were calculated by the slope area method or were coordinated with the results of another flood insurance study.

Cross section data for streams in the area were obtained from field surveys. All bridges and culverts along the streams studied in detail were surveyed to elevation data and structural geometry.

The study model for the Kankakee River does not delineate a floodway, and therefore no entry in Table 12. The modeling results are shown in a flood profile in Exhibit 2.

Starting elevations at the mouth of Sand Creek and Coffee Creek were determined by the slope-area method. Starting elevations at the downstream corporate limits of Chesterton for the East Arm Little Calumet River and Peterson Ditch were obtained from the point of confluence with the Little Calumet River. Normal depth was used for the starting water-surface elevations for the Little Calumet River.

Starting water-surface elevations which were used for Burns Waterway were less than the highwater levels on Lake Michigan with a corresponding frequency of about a 2% annual frequency. The backwater computation for Burns Waterway were continued upstream through the Little Caumet River. The slope-area method was used to determine the starting water-surface elevation at the downstream ends of Willow Creek, Lenburg Ditch, Crisman Ditch, and the East Arm Little Calumet River.

A procedure know as a reservoir route was performed for Robbins Ditch at the earthen dam, the Chessie System Railroad, and the 80-90 Toll Road; for Lenburg Ditch at the Elgin Joliet & Eastern railroad; and for Crisman Creek above the 2,100 feet culvert. The reservoir route studies two cases in computing water-surface elevations upstream from bridges, dams or culverts which significantly inhibit the passage of floodwater. For the

first case, a water-surface elevation was computed for the upstream reservoir created by the obstruction at the chronological point of the storm at which maximum flood flow are discharged into the reservoirs. The elevation for the reservoir was used in the HEC-2 program as the starting water-surface elevation for the condition for maximum flow into the reservoir. For the second case, a maximum water-surface elevation for the reservoir was computed. In the HEC-2 program, this starting water-surface elevation was used with the flow that occurs upstream during the time when the reservoir is at maximum elevation. The higher of the two computed elevations was used at all points.

All flooding sources studied by approximate methods were analyzed by use of recorded USGS high water marks, regional stage frequency relationships, or Manning's equation for depth of channel flow.

In order to determine the approximate 1% chance elevation for the lakes, the record of maximum annual lake elevations for gagin stations at each of the lakes as analyzed. The analyese were prefomred with the USACE program Floodflow Frequency Analysis. A summary of the results is shown in Table 10.

Table 10: Summary of Lake Elevations

Gage	Normal Water Level (NAVD 88)	Year of Record	Recorded High Water (NAVD 88)	1% Annual Chance Elevation (NAVD 88)
Flint Lake At southeast corner of lake	797.4	1973	800.8	801.2
Lake Eliza At north side of lake	739.0	1974	746.9	747.3
Wauhob Lake At northwest corner of lake	798.2	1973	800.8	801.3

Countywide Analysis

For the new detailed study reaches, the USACE HEC-RAS program was used. HEC-RAS is an updated version of the HEC-2 program used to perform step-backwater analyses. Cross-section numbers were revised to reflect river miles. Field data and surveyed bridge data was entered into the model and cross sections were generated and checked for accuracy against the field data. Terrian data was based on 2-ft contours.

Channel and overbank roughness factors (Manning's "n" values) used in the hydraulic computations were chosen by engineering judgment and were based on field observations

of the stream and floodplain areas. Channel and overbank roughness factors used in the detailed studies are summarized by stream in 11.

Table 11: Channel and Overband Roughness Factors - Countywide FIS

Stream	Channel "n"	Overbank "n"
Duck Creek	0.045 – 0.048	0.050 – 0.100
Frog Creek	0.040 – 0.048	0.050 – 0.100
Robbins Ditch	0.040	0.060 – 0.100
Salt Creek	0.040 – 0.060	0.040 – 0.100

Flood profiles were prepared for all streams studied by detailed methods and show computed water-surface elevations to an accuracy of 0.5 feet for floods of the selected recurrence intervals. For this countywide FIS, flood profiles and approved LOMRs have been consolidated into continuous stream reaches and adjusted to reflect the current vertical datum as described in Section 3.3. New profiles have been prepared for the new detailed studies and for the purposes of incorporating the LOMRs described in Section 2.1 above.

The flood insurance study of Duck Creek in Porter County, Indiana covers 3.0 river miles as measured 80 feet downstream of the Lake-Porter County Line to 310 feet upstream of Jones Road. Discharges were determined using Indiana Department of Natural Resources coordinated discharges. The downstream boundary condition for the 1 and 0.2-percent-annual-chance flood was based on the water surface elevation of Section "R" from the previously published FIS for the City of Hobart, Indiana, Lake County. Known water surface elevations of 611.4 feet and 612.7 feet (NAVD 1988) were used as a boundary condition for the 1-, and 0.2-percent-annual-chance flows, respectively.

The study of Frog Creek begins at the upstream end, approximately 550 ft east of CR 625W and continues to the downstream end, at the Lake & Porter County Line). The discharge value was taken from the coordinated discharge graph for tributaries to Deep River/Turkey Creek within Lake County. The slope-area method with a normal slope of 0.003 ft/ft was used the boundary condition.

The flood insurance study revision of Salt Creek covers 25 miles reach of Salt Creek in Porter County, Indiana as measured from the mouth to Division Road and from Division Road to 1200 feet downstream of County Road 100 East. These analyses were performed based on 2-foot contour mapping from the mouth to a point approximately 1000 feet downstream of Division Road. The remaining portion of Salt Creek was analyzed using 10-foot contour data and cross-section data from the pre-countwide HEC-2 FIS model. The downstream boundary condition for the 1-, and 0.2-percent-annual-chance flood was based on the slope-area method with a normal depth slope of 0.001. The vertical datum of the modeling cross sections is NGD 1929, and the results have been converted to NAVD 1988 by subtracting 0.30 feet.

The restudy of Robbins Ditch reach begins at river station 15681 (at Robbins Road) and continues to river station 8554 (upstream of the Indiana Toll Road). The model has a cumulative reach length of 7127 ft. The original study reach was listed to end at Central Avenue, however, the model was extended an additional 700' to the Toll Road to facilitate easier modeling and tie-in to the existing study. The boundary conditions were based on the elevations shown for cross-section E of the pre-countywide FIS study for Robbins Ditch.

For the new approximate study areas, analyses were based on field inspection and modeling of the stream reaches using simplified HEC-RAS models. Structural measurements or field surveying was not performed. Starting elevations were assumed to be normal depth.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities.

In this revision, a vertical datum conversion of -0.30 foot was calculated at the centroid of the county and used to convert all elevations in Porter County from NGVD29 to NAVD88 using the National Geodetic Survey's VERTCON online utility (VERTCON, 2005).

$$NAVD88 = NGVD29 - 0.30$$

For more information on NAVD88, see the FEMA publication entitled Converting the National Flood Insurance Program to the North American Vertical Datum of 1988 (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

The coordinate system used for the production of the digital FIRMs in the Transverse Mercator projection, Indiana State Plane coordinate system, East Zone, referenced to the North American Datum of 1983 and the GRS 1980 spheroid.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, and the Floodway Data table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps provided by the Indiana DNR or 2-foot mapping provided by Porter County.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE); and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual chance floodplain boundary is shown on the FIRM.

4.2 Floodways

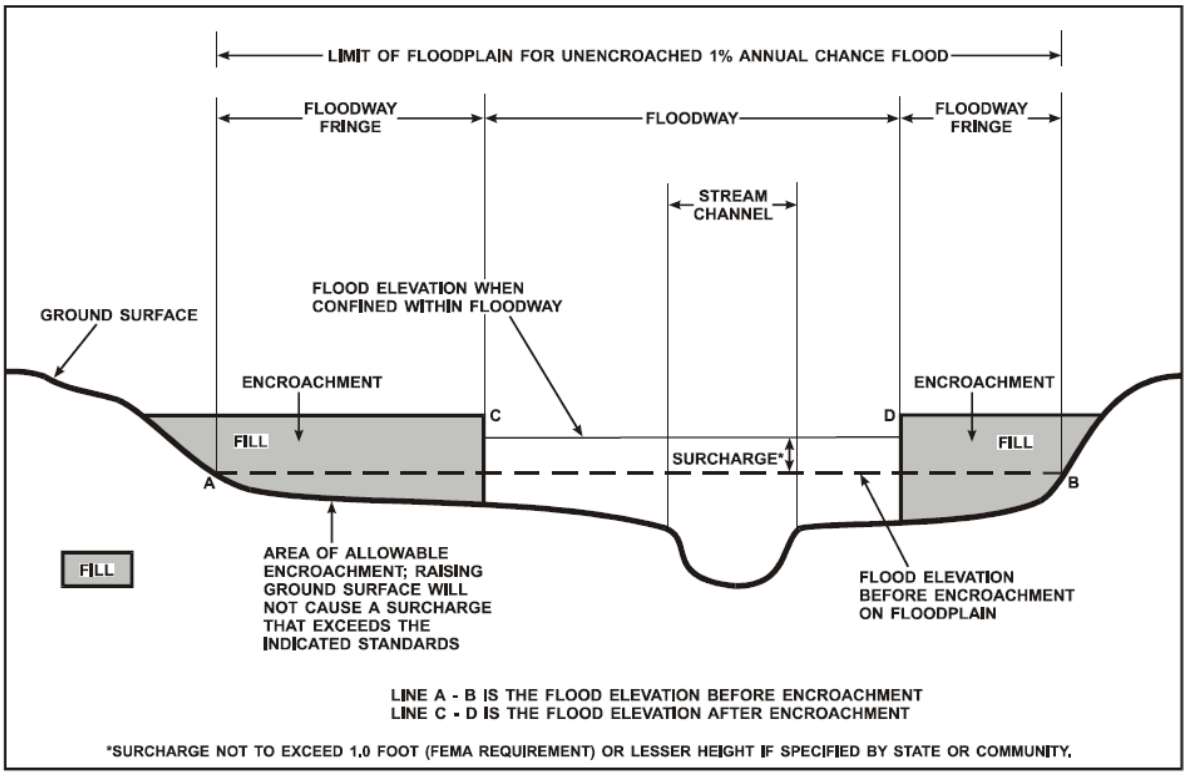
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The State of Indiana, however, per Indiana Code IC 14-28-1 and Indiana Administrative Code 312 IAC 10, has designated that encroachment in the floodplain is limited to that which will cause no significant increase in flood height. As a result, floodways for this study are delineated based on a flood surcharge of less than 0.15 feet. The floodways in this study were approved by the IDNR, and are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections (Table 12). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood more than the allowable flood surcharge limit at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

Figure 1: Floodway Schematic



FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
BURNS WATERWAY								
A	0.05	207	1630	6.5	584.0	583.7	583.8	0.1
B	0.32	230	1955	5.4	585.7	585.7	585.8	0.1
C	0.67	134	1753	6.0	587.6	587.6	587.7	0.1
D	0.69	217	2485	4.3	588.4	588.4	588.5	0.1
E	0.92	204	2838	3.7	589.9	589.9	590.0	0.1
F	0.94	196	2703	3.9	589.9	589.9	590.0	0.1
G	1.24	167	2452	4.3	590.4	590.4	590.5	0.1
LITTLE CALUMET RIVER								
H	1.43 [2]	310	1646	3.2	590.9	590.9	591.0	0.1
I	1.83 [2]	300	1958	2.7	591.3	591.3	591.4	0.1
J	2.20 [2]	240	1894	2.7	591.6	591.6	591.7	0.1
K	2.51 [2]	260	1996	2.6	591.8	591.8	591.9	0.1
L	2.74 [2]	190	1704	3.0	592.1	592.1	592.2	0.1
M	3.06 [2]	245	1523	3.4	592.4	592.4	592.5	0.1
N	3.35 [2]	190	1557	3.3	592.8	592.8	592.9	0.1
O	3.73 [2]	185	1631	3.2	593.2	593.2	593.3	0.1
P	4.11 [2]	183	1520	3.4	594.0	594.0	594.0	0.0
Q	4.21 [2]	236	1691	2.8	594.3	594.3	594.4	0.1
R	4.31 [2]	343	1579	3.0	594.6	594.6	594.7	0.1

[1] BURNS WATERWAY - MILES ABOVE MOUTH; LITTLE CALUMET RIVER - MILES ABOVE MOUTH

[2] STATIONING CONTINUES FROM BURNS WATERWAY

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
COFFEE CREEK								
A	0.08	340	787	2.2	622.0	617.4 [2]	617.5	0.1
B	0.40	170	848	2.1	624.7	624.7	624.8	0.1
C	0.50	80	575	3.1	625.7	625.7	625.7	0.0
D	0.55	319	2153	0.8	626.1	626.1	626.2	0.1
E	1.00	270	835	2.1	627.6	627.6	627.6	0.0
F	1.23	240	917	1.9	630.5	630.5	630.5	0.0
G	1.39	239	1281	1.3	631.0	631.0	631.1	0.1
H	1.90	232	389	4.4	632.4	632.4	632.4	0.0
I	2.32	220	590	2.9	636.8	636.8	636.8	0.0
J	2.76	250	255	6.7	641.6	641.6	641.6	0.0
CRISMAN DITCH								
A	150	17	52	3.9	622.9	622.9	623.0	0.1
B	1,360	58	196	1.0	632.3	632.3	632.4	0.1
C	1,955	115	186	1.1	632.5	632.5	632.6	0.1
DUCK CREEK								
A	16,103	170	635	0.7	615.4	611.7 [3]	611.7	0.0
B	17,374	110	248	1.9	615.4	612.3 [3]	612.4	0.1
C	18,361	148	339	1.4	615.4	613.6 [3]	613.7	0.1
D	19,923	100	222	2.1	615.8	615.8	615.9	0.1
E	20,494	58	195	2.4	616.2	616.2	616.3	0.1
F	21,291	113	248	1.8	617.3	617.3	617.4	0.1
G	21,894	210	422	1.1	618.9	618.9	618.9	0.0
H	23,048	125	70	3.4	620.2	620.2	620.3	0.1
I	24,135	127	103	2.3	624.2	624.2	624.3	0.1
J	24,927	40	69	3.5	628.1	628.1	628.1	0.0

[1] COFFEE CREEK - MILES ABOVE MOUTH; CRISMAN DITCH - FEET ABOVE CONFLUENCE WITH WILLOW CREEK; DUCK CREEK - FEET ABOVE MOUTH

[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM EAST ARM LITTLE CALUMET RIVER

[3] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM DEEP RIVER

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN
AND INCORPORATED AREAS

FLOODWAY DATA

COFFEE CREEK/CRISMAN DITCH / DUCK CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
DUCK CREEK								
K	25,750	40	76	3.2	631.1	631.1	631.1	0.0
L	27,609	75	162	1.5	635.2	635.2	635.2	0.0
M	28,313	40	83	2.9	636.2	636.2	636.3	0.1
N	28,938	152	427	0.6	642.7	642.7	642.7	0.0
O	29,256	50	85	2.8	642.8	642.8	642.8	0.0
P	30,035	71	80	3.0	645.8	645.8	645.8	0.0
Q	30,748	50	115	2.1	647.1	647.1	647.1	0.0
R	31,318	90	239	1.0	653.1	653.1	653.1	0.0
EAST ARM LITTLE CALUMET RIVER								
A	0.14	146	1620	4.2	590.4	589.1	589.2	0.1
B	0.59	328	1733	3.9	591.4	591.4	591.5	0.1
C	1.11	379 †	3013	2.2	594.0	594.0	594.1	0.1
D	1.28	191 †	2019	3.3	594.4	594.4	594.5	0.1
E	2.08	351 †	1012	3.6	595.7	595.7	595.8	0.1
F	2.65	983	1981	1.8	602.5	602.5	602.6	0.1
G	3.49	680	2124	1.7	605.7	605.7	605.8	0.1
H	3.56	555	1931	1.9	606.1	606.1	606.2	0.1
I	4.16	472	637	5.7	608.9	608.9	609.0	0.1
J	4.18	572	1277	2.9	609.6	609.6	609.7	0.1
K	5.30	607	2975	1.2	612.8	612.8	612.9	0.1
L	5.32	616	3139	1.2	613.2	613.2	613.3	0.1
M	6.04	905	6013	0.6	613.8	613.8	613.9	0.1
N	6.49	532	3217	1.2	614.3	614.3	614.4	0.1
O	6.67	400	2221	1.6	616.2	616.2	616.3	0.1
P	7.33	324	1384	2.6	617.3	617.3	617.4	0.1
Q	7.45	243	1727	2.1	617.8	617.8	618.9	0.1
R	8.03	268	1222	3.0	620.1	620.1	620.2	0.1
S	8.55	300	2542	1.4	621.5	621.5	621.6	0.1
T	8.95	568	2726	1.3	621.8	621.8	621.9	0.1
U	9.25	327	2049	1.3	624.0	624.0	624.1	0.1

[1] DUCK CREEK - FEET ABOVE MOUTH; EAST ARM LITTLE CALUMET RIVER - MILES ABOVE CONFLUENCE WITH BURNS WATERWAY

† FLOODWAY WIDTH MAY DIFFER FROM FIRM. PLEASE SEE FIRM FOR REGULATORY WIDTH.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
FROG CREEK								
A	1,631	136	885	0.4	613.4	613.4	613.4	0.0
B	2,065	119	662	0.5	613.4	613.4	613.4	0.0
C	2,725	230	3289	0.1	627.5	627.5	627.5	0.0
D	4,341	473	3734	0.1	627.5	627.5	627.5	0.0
E	5,270	175	1968	0.2	627.5	627.5	627.5	0.0
F	6,851	214	1788	0.2	627.5	627.5	627.6	0.1
G	8,439	166	792	0.4	627.5	627.5	627.6	0.1
H	9,233	153	591	0.6	630.2	630.2	630.2	0.0
I	10,249	190	174	1.9	630.6	630.6	630.7	0.1
LENBURG DITCH								
A	660	99	312	0.4	627.2	627.2	627.3	0.1
B	1,150	127	298	0.5	627.5	627.5	627.6	0.1
C	2,320	130	222	0.6	629.2	629.2	629.3	0.1

[1] FROG CREEK - FEET ABOVE MOUTH; LENBURG DITCH - FEET ABOVE MOUTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
PETERSON DITCH								
A	211	135	262	1.3	614.8	614.8	614.8	0.0
B	903	95	166	2.0	615.4	615.4	615.4	0.0
C	1,637	115	202	1.6	621.0	621.0	621.0	0.0
D	1,727	105	651	0.5	626.3	626.3	626.3	0.0
E	1,922	98	447	0.7	626.3	626.3	626.3	0.0
F	2,107	101	239	1.4	626.3	626.3	626.3	0.0
G	2,313	99	181	1.8	626.7	626.7	626.7	0.0
H	2,445	56	173	1.8	626.8	626.8	626.8	0.0
I	3,052	54	67	4.6	629.0	629.0	629.0	0.0
J	4,330	74	85	3.8	633.6	633.6	633.6	0.0
K	4,430	200 *	-- [2]	-- [2]	636.2	636.2	636.2	0.0
L	4,958	200 *	-- [2]	-- [2]	636.2	636.2	636.2	0.0
M	5,491	475 *	-- [2]	-- [2]	636.2	636.2	636.2	0.0
N	5,966	725 *	-- [2]	-- [2]	636.2	636.2	636.2	0.0
O	6,336	200 *	-- [2]	-- [2]	636.7	636.7	636.7	0.0
P	6,706	200 *	-- [2]	-- [2]	636.7	636.7	636.7	0.0
Q	6,758	200 *	-- [2]	-- [2]	636.7	636.7	636.7	0.0
R	6,875	200 *	-- [2]	-- [2]	636.7	636.7	636.7	0.0
S	7,070	285 *	-- [2]	-- [2]	637.3	637.3	637.3	0.0
T	7,603	340 *	-- [2]	-- [2]	637.4	637.4	637.4	0.0
U	7,820	200 *	-- [2]	-- [2]	637.5	637.5	637.5	0.0
V	7,920	200 *	-- [2]	-- [2]	637.7	637.7	637.7	0.0
W	8,395	200 *	-- [2]	-- [2]	637.7	637.7	637.7	0.0
X	9,108	240 *	-- [2]	-- [2]	637.7	637.7	637.7	0.0
Y	9,240	220 *	-- [2]	-- [2]	637.9	637.9	637.9	0.0
Z	9,499	200 *	-- [2]	-- [2]	637.9	637.9	637.9	0.0
AA	9,874	200 *	-- [2]	-- [2]	638.0	638.0	638.0	0.0
AB	10,708	200 *	-- [2]	-- [2]	638.1	638.1	638.1	0.0

[1] FEET ABOVE CONFLUENCE WITH LITTLE CALUMET RIVER

[2] NOT APPLICABLE

* FLOODWAY WIDTHS WERE DETERMINED IN ACCORD WITH ADMINISTRATIVE PROCEDURES OF THE STATE OF INDIANA, DEPARTMENT OF NATURAL RESOURCES, FLOODWAY CRITERIA

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
PETERSON DITCH								
AC	11,004	150	-- [2]	-- [2]	-- [3]	638.5	638.5	0.0
AD	11,750	-- *	-- [2]	-- [2]	-- [3]	636.6 †	636.6 †	0.0
AE	13,800	-- *	-- [2]	-- [2]	-- [3]	637.9 †	637.9 †	0.0

[1] FEET ABOVE CONFLUENCE WITH LITTLE CALUMET RIVER

[2] NOT APPLICABLE

[3] REGULATORY FLOOD ELEVATIONS CONTAINED IN CULVERT; NO ELEVATIONS SHOWN ON MAP

† FLOOD ELEVATIONS REVISED BY LOMR 95-05-283P

* FLOODWAY WIDTHS WERE DETERMINED IN ACCORD WITH ADMINISTRATIVE PROCEDURES OF THE STATE OF INDIANA, DEPARTMENT OF NATURAL RESOURCES, FLOODWAY CRITERIA

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
ROBBINS DITCH								
A	300	150	138	2.1	609.2	603.7 [2]	603.7	0.0
B	1,624	10	43	6.9	609.2	608.0 [2]	608.1	0.1
C	4,750	264	1680	0.3	623.2	623.2	623.2	0.0
D	5,800	97	229	2.1	624.1	624.1	624.1	0.0
E	8,374	134	411	1.8	627.2	627.2	627.2	0.0
F	9,474	120	498	1.5	631.6	631.6	631.6	0.0
G	9,689	42	249	2.4	631.7	631.7	631.7	0.0
H	10,092	65	256	2.4	631.9	631.9	632.0	0.1
I	10,878	194	606	1.0	635.2	635.2	635.2	0.0
J	11,157	294	942	0.6	635.2	635.2	635.2	0.0
K	11,427	310	1086	0.6	635.2	635.2	635.3	0.1
L	11,627	280	882	0.7	635.2	635.2	635.3	0.1
M	11,951	500	1051	0.6	635.3	635.3	635.3	0.0
N	12,342	780	1421	0.4	635.3	635.3	635.4	0.1
O	13,168	670	1385	0.5	635.4	635.4	635.5	0.1
P	13,395	360	712	0.8	635.4	635.4	635.5	0.1
Q	13,638	187	295	2.0	635.5	635.5	635.6	0.1
R	13,876	120	130	4.6	635.9	635.9	636.0	0.1
S	14,059	166	246	2.4	636.8	636.8	636.8	0.0
T	14,285	33	105	5.7	637.1	637.1	637.1	0.0
U	14,442	46	147	4.1	637.8	637.8	637.9	0.1
V	14,657	134	175	3.4	638.3	638.3	638.4	0.1
W	15,267	513	845	0.7	639.1	639.1	639.2	0.1
X	15,600	330	503	1.2	639.2	639.2	639.3	0.1
Y	15,844	357	526	1.1	639.4	639.4	639.5	0.1

[1] FEET ABOVE MOUTH

[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM SALT CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
SALT CREEK								
A	1,828	220	1764	2.5	595.0	595.0	595.1	0.1
B	5,554	484	562	6.5	596.9	596.9	597.0	0.1
C	5,752	485	679	5.5	598.6	598.6	598.7	0.1
D	7,688	395	1410	3.2	602.9	602.9	603.0	0.1
E	9,551	395	757	5.4	605.4	605.4	605.5	0.1
F	9,983	521	2641	2.4	606.5	606.5	606.6	0.1
G	17,749	614	970	3.9	609.6	609.6	609.7	0.1
H	18,043	530	2573	2.2	610.5	610.5	610.6	0.1
I	19,254	846	1108	4.2	610.9	610.9	610.9	0.0
J	19,526	825	1416	3.2	612.0	612.0	612.0	0.0
K	22,353	107	813	4.5	613.1	613.1	613.1	0.0
L	22,753	694	3857	1.5	614.0	614.0	614.0	0.0
M	25,325	1222	1395	3.7	614.3	614.3	614.4	0.1
N	25,986	799	2589	2.3	615.6	615.6	615.6	0.0
O	29,277	337	1710	3.1	616.8	616.8	616.9	0.1
P	31,416	332	1155	3.2	618.1	618.1	618.2	0.1
Q	34,381	318	969	3.7	619.8	619.8	619.9	0.1
R	35,220	826	5572	0.8	620.2	620.2	620.2	0.1
S	37,813	336	1864	2.0	620.5	620.5	620.6	0.1
T	39,363	1566	3056	1.0	620.7	620.7	620.8	0.1
U	46,398	633	2148	2.4	622.5	622.5	622.6	0.1
V	47,427	540	596	5.0	623.1	623.1	623.2	0.1
W	47,723	467	727	4.0	624.8	624.8	624.8	0.0
X	48,315	500	1290	3.3	625.7	625.7	625.8	0.1
Y	53,619	550	2295	1.9	627.5	627.5	627.6	0.1
Z	57,295	792	640	4.7	629.9	629.9	630.0	0.1
AA	57,551	516	3048	1.4	631.1	631.1	631.1	0.0
AB	62,716	539	1729	2.9	632.6	632.6	632.7	0.1

[1] FEET ABOVE MOUTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
SALT CREEK								
AC	66,734	694	630	4.1	635.7	635.7	635.8	0.1
AD	66,830	781	756	3.3	636.4	636.4	636.5	0.1
AE	69,018	777	2587	1.7	638.0	638.0	638.1	0.1
AF	72,715	220	586	5.8	639.8	639.8	639.8	0.0
AG	74,019	387	538	4.2	642.7	642.7	642.8	0.1
AH	74,328	506	1034	2.3	648.0	648.0	648.0	0.0
AI	77,686	1033	4075	1.0	648.2	648.2	648.3	0.1
AJ	78,853	471	1077	2.1	648.8	648.8	648.8	0.0
AK	82,382	455	1044	3.4	649.7	649.7	649.8	0.1
AL	86,670	290	881	3.3	656.1	656.1	656.2	0.1
AM	89,889	401	771	3.5	659.2	659.2	659.3	0.1
AN	91,425	337	246	5.9	662.2	662.2	662.2	0.0
AO	91,488	371	356	5.0	663.3	663.3	663.3	0.0
AP	94,490	426	284	5.1	667.1	667.1	667.2	0.1
AQ	94,621	318	627	2.9	670.3	670.3	670.4	0.1
AR	98,121	327	996	2.9	672.1	672.1	672.2	0.1
AS	100,263	62	395	3.6	673.3	673.3	673.4	0.1
AT	102,444	53	255	5.6	675.9	675.9	676.0	0.1
AU	103,184	102	222	6.7	678.8	678.8	678.9	0.1
AV	103,604	320	814	3.0	681.1	681.1	681.1	0.0
AW	105,223	112	439	2.9	684.1	684.1	684.2	0.1
AX	106,232	129	290	4.1	684.8	684.8	684.9	0.1
AY	106,396	742	496	2.7	687.3	687.3	687.4	0.1
AZ	107,751	173	302	4.0	687.7	687.7	687.7	0.0
BA	107,975	155	584	2.8	688.3	688.3	688.3	0.0
BB	108,594	327	1561	1.0	689.1	689.1	689.2	0.1
BC	109,885	900	4886	0.2	689.1	689.1	689.2	0.1
BD	112,176	181	519	1.5	689.2	689.2	689.3	0.1
BE	112,401	181	735	1.2	690.0	690.0	690.1	0.1
BF	113,850	1363	4690	0.2	690.0	690.0	690.1	0.1

[1] FEET ABOVE MOUTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
SALT CREEK								
BG	116,432	269	685	1.2	690.1	690.1	690.2	0.1
BH	117,995	460	1691	0.6	690.2	690.2	690.3	0.1
BI	118,262	260	1260	0.7	690.3	690.3	690.3	0.0
BJ	118,824	295	1956	0.4	692.4	692.4	692.4	0.0
BK	119,557	415	2755	0.2	692.4	692.4	692.4	0.0
BL	121,494	195	816	1.1	692.4	692.4	692.5	0.1
BM	122,552	435	1003	1.1	692.6	692.6	692.6	0.0
BN	126,329	355	908	1.1	694.5	694.5	694.5	0.0
BO	128,535	235	344	3.0	695.2	695.2	695.3	0.1
SAND CREEK								
A	0.46	336	1184	0.4	628.3	628.3	628.3	0.0
B	1.00	60	187	2.5	632.5	632.5	632.6	0.1

[1] SALT CREEK - FEET ABOVE MOUTH; SAND CREEK - MILES ABOVE MOUTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FT/SEC)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
WILLOW CREEK								
A	100	50	274	4.7	594.0	586.5 [2]	586.6	0.1
B	915	45	268	4.9	594.0	588.5 [2]	588.6	0.1
C	3,130	44	211	6.2	595.2	595.2	595.2	0.0
D	5,460	33	220	5.9	604.1	604.1	604.2	0.1
E	7,200	82	396	3.3	607.2	607.2	607.2	0.0
F	8,560	152	560	2.3	614.2	614.2	614.2	0.0
G	10,400	244	993	1.3	615.2	615.2	615.2	0.0
H	11,619	83	410	3.2	616.0	616.0	616.1	0.1
I	12,155	57	280	4.6	616.9	616.9	617.0	0.1
J	14,330	251	1128	1.2	617.5	617.5	617.6	0.1
K	15,883	49	256	5.1	617.7	617.7	617.8	0.1
L	17,280	130	948	1.1	618.3	618.3	618.4	0.1
M	18,083	29	195	5.4	618.3	618.3	618.4	0.1
N	18,650	67	229	4.6	619.0	619.0	619.1	0.1
O	20,570	77	276	3.8	621.2	621.2	621.2	0.0
P	22,060	276	448	2.3	623.1	623.1	623.1	0.0
Q	22,965	51	280	3.7	624.7	624.7	624.7	0.0
R	23,300	53	236	4.4	624.8	624.8	624.8	0.0
S	24,750	48	233	2.8	626.0	626.0	626.1	0.1
T	25,500	45	227	2.9	626.7	626.7	626.7	0.0
U	28,250	32	156	4.2	629.5	629.5	629.5	0.0
V	29,574	20	123	5.3	631.4	631.4	631.4	0.0

[1] FEET ABOVE MOUTH

[2] ELEVATIONS COMPUTED WITHOUT CONSIDERATION OF BACKWATER EFFECTS FROM LITTLE CALUMET RIVER

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, and areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance
policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current FIRM presents flooding information for the entire geographic area of Porter County. Previously, separate FIRMs were prepared for each identified flood prone

incorporated community and for the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in FIRM Panel Index and/or Table 13.

7.0 OTHER STUDIES

This FIS report either supersedes or is compatible with all previous studies on streams studied in this report and should be considered authoritative for purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Flood Insurance and Mitigation Division, Federal Emergency Management Agency, Region V, 536 S. Clark Street, 6th Floor, Chicago, IL 60605.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Beverly Shores, Town of	March 23, 1973	None	March 23, 1973	October 17, 1975
Burns Harbor, Town of	June 7, 1974	June 1, 1981	TBD	None
Chesterton, Town of	February 1, 1974	October 24, 1975	February 1, 1980	March 15, 1984
Dune Acres, Town of	December 28, 1973	March 26, 1976	April 24, 1981	None
Hebron, Town of	March 21, 1975	None	October 9, 1981	None
*Kouts, Town of	N/A	None	N/A	None
Ogden Dunes, Town of	May 31, 1974	None	August 5, 1986	None
Pines, Town of	March 21, 1975	None	TBD	None
Portage, City of	July 26, 1974	October 31, 1975	June 1, 1982	None
Porter County (Unincorporated Areas)	April 14, 1978	None	April 1, 1982	None
Porter, Town of	December 28, 1973	March 19, 1976	June 4, 1980	None
Valparaiso, City of	January 9, 1974	April 9, 1976	March 2, 1979	None

*No Special Flood Hazard Areas Identified

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN (AND INCORPORATED AREAS)

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

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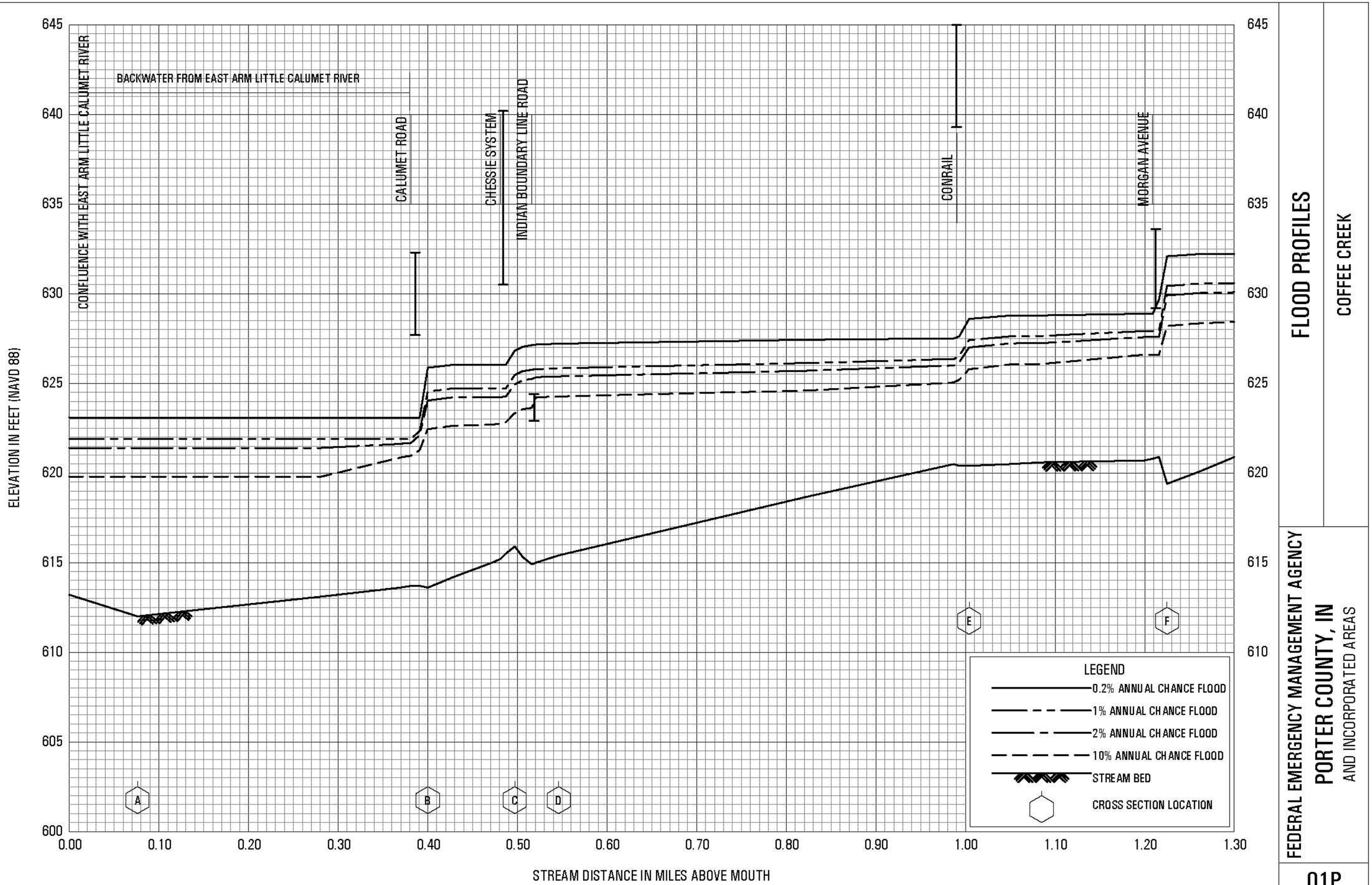


FLOOD PROFILES

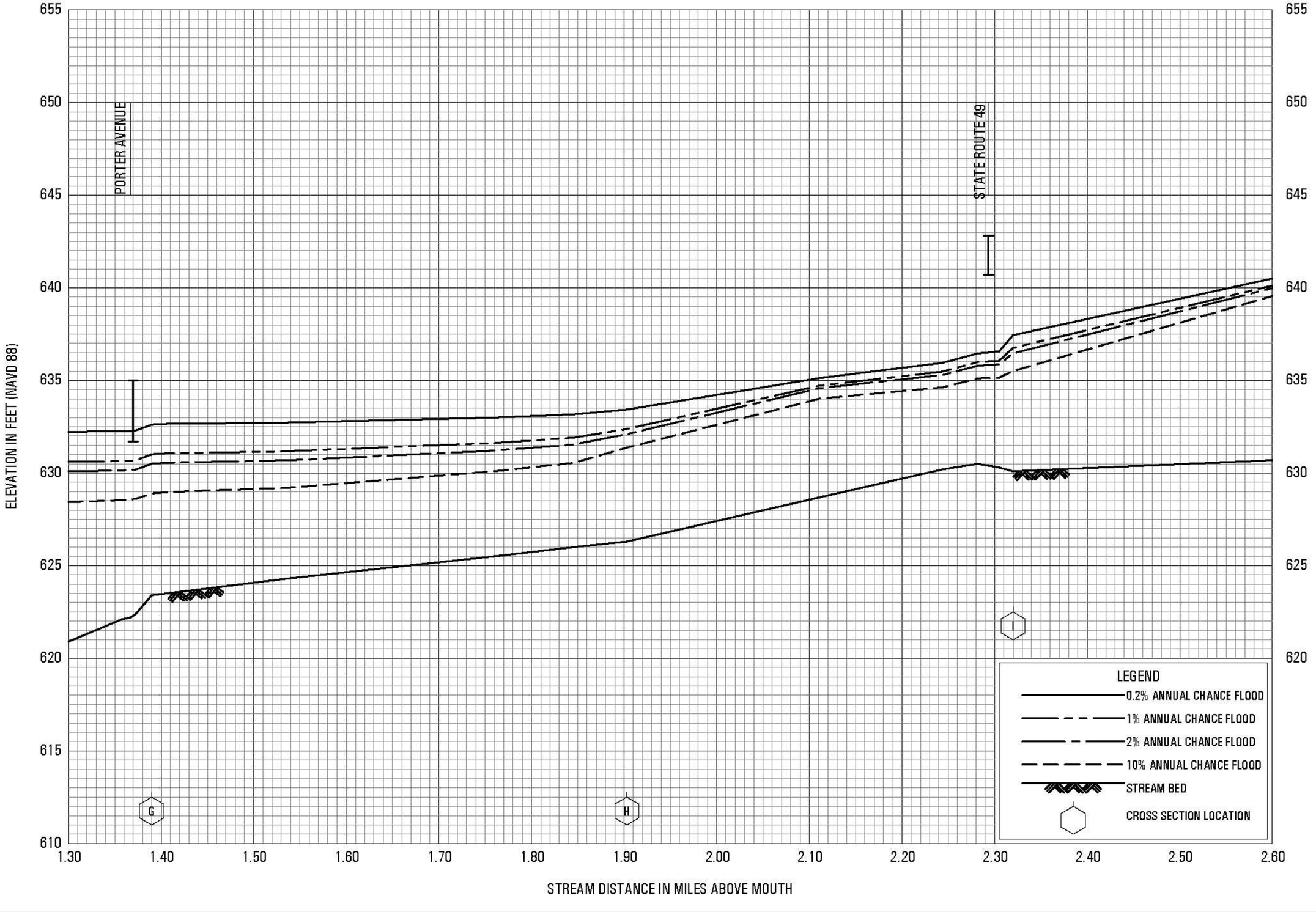
COFFEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

01P



FLOOD PROFILES

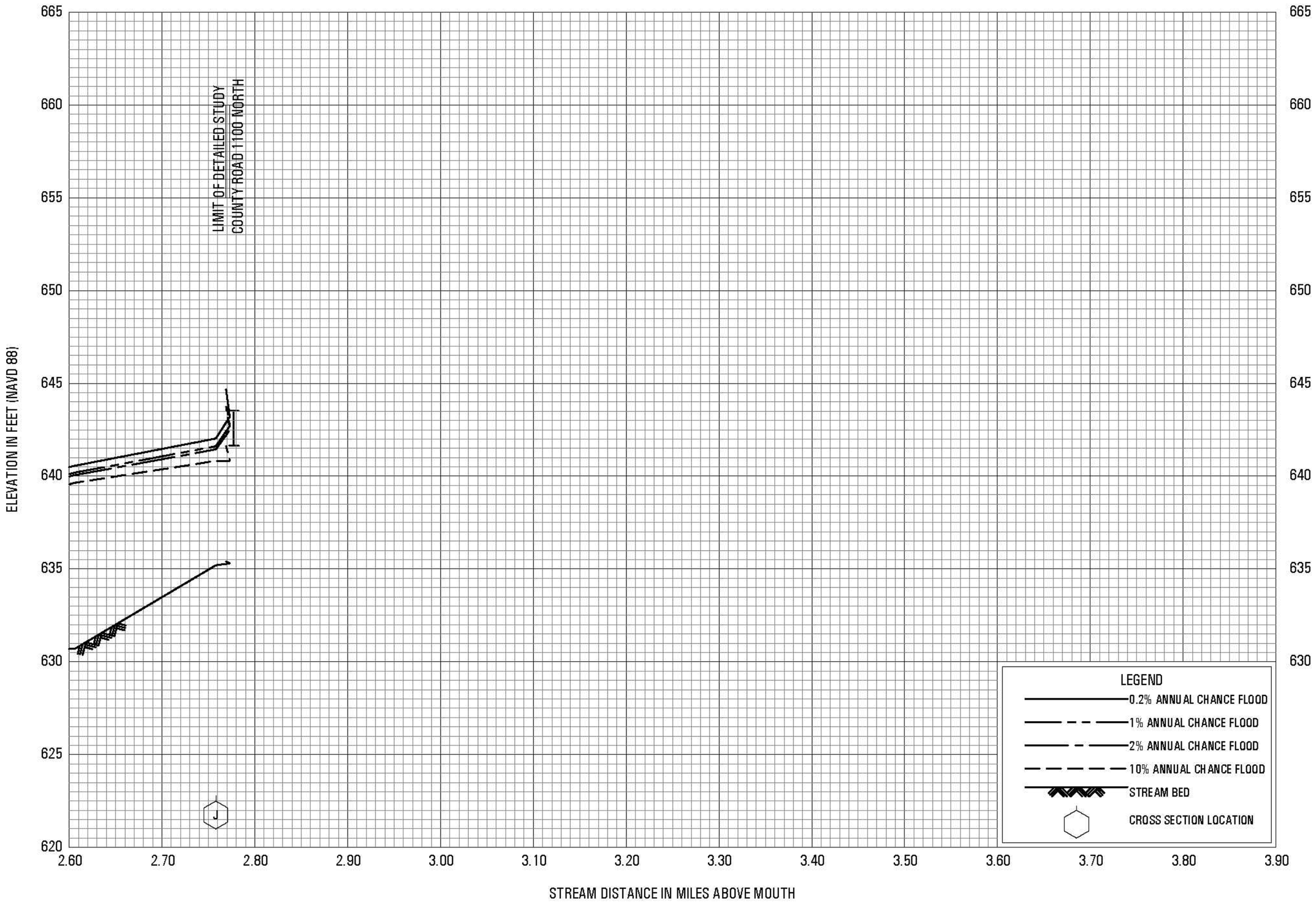
COFFEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

02P



FLOOD PROFILES

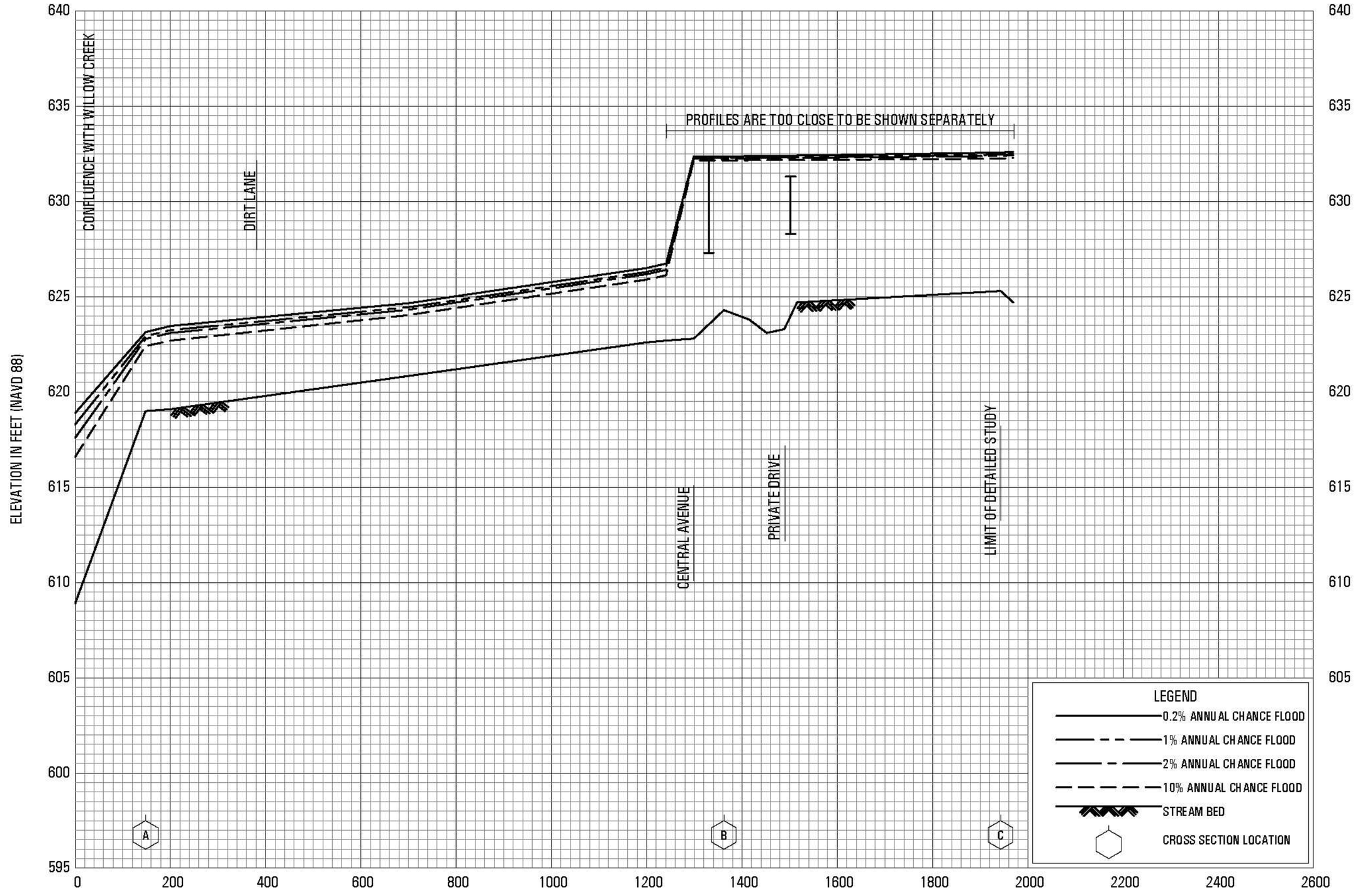
COFFEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

03P



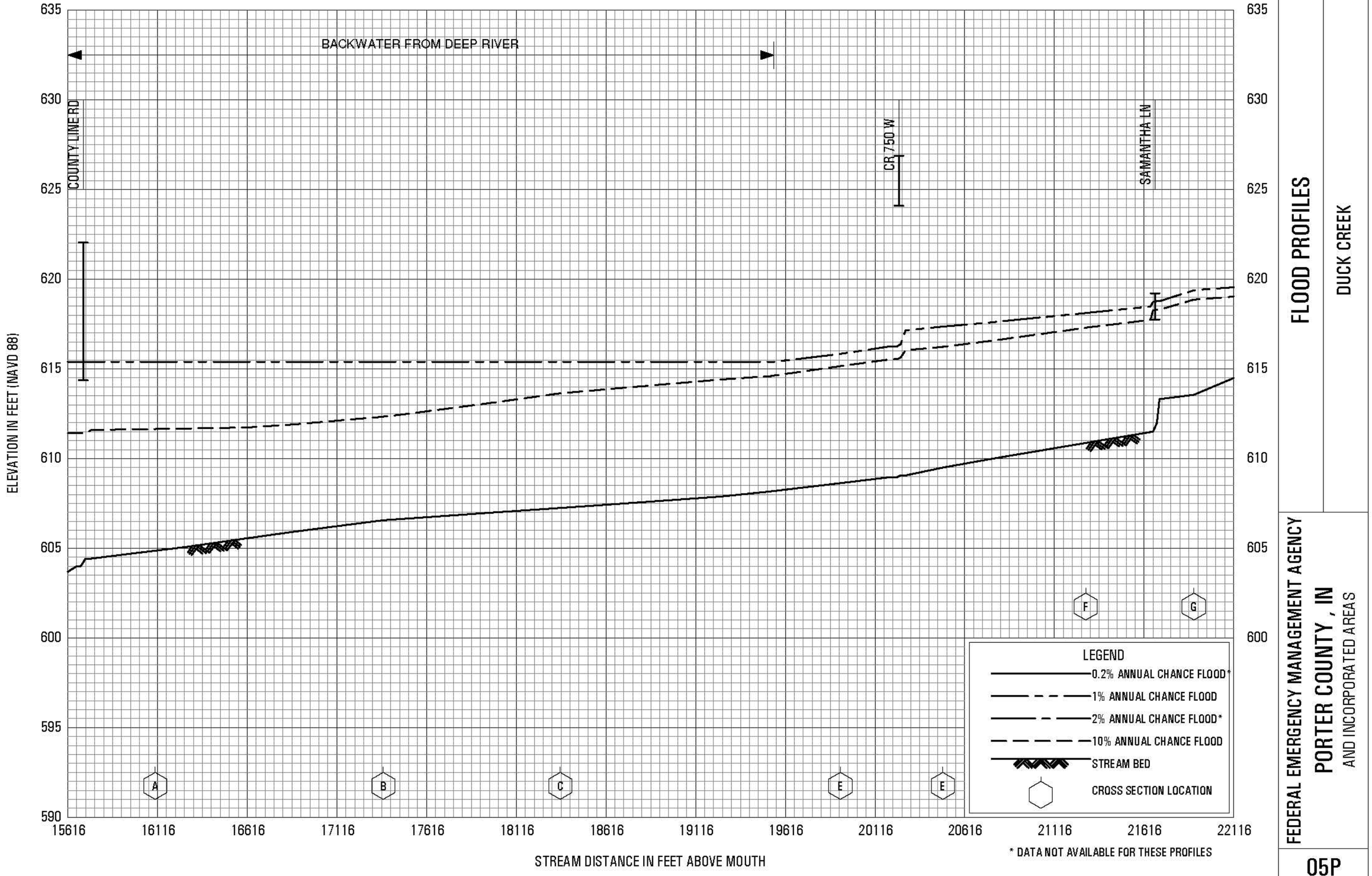
FLOOD PROFILES

CRISMAN DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

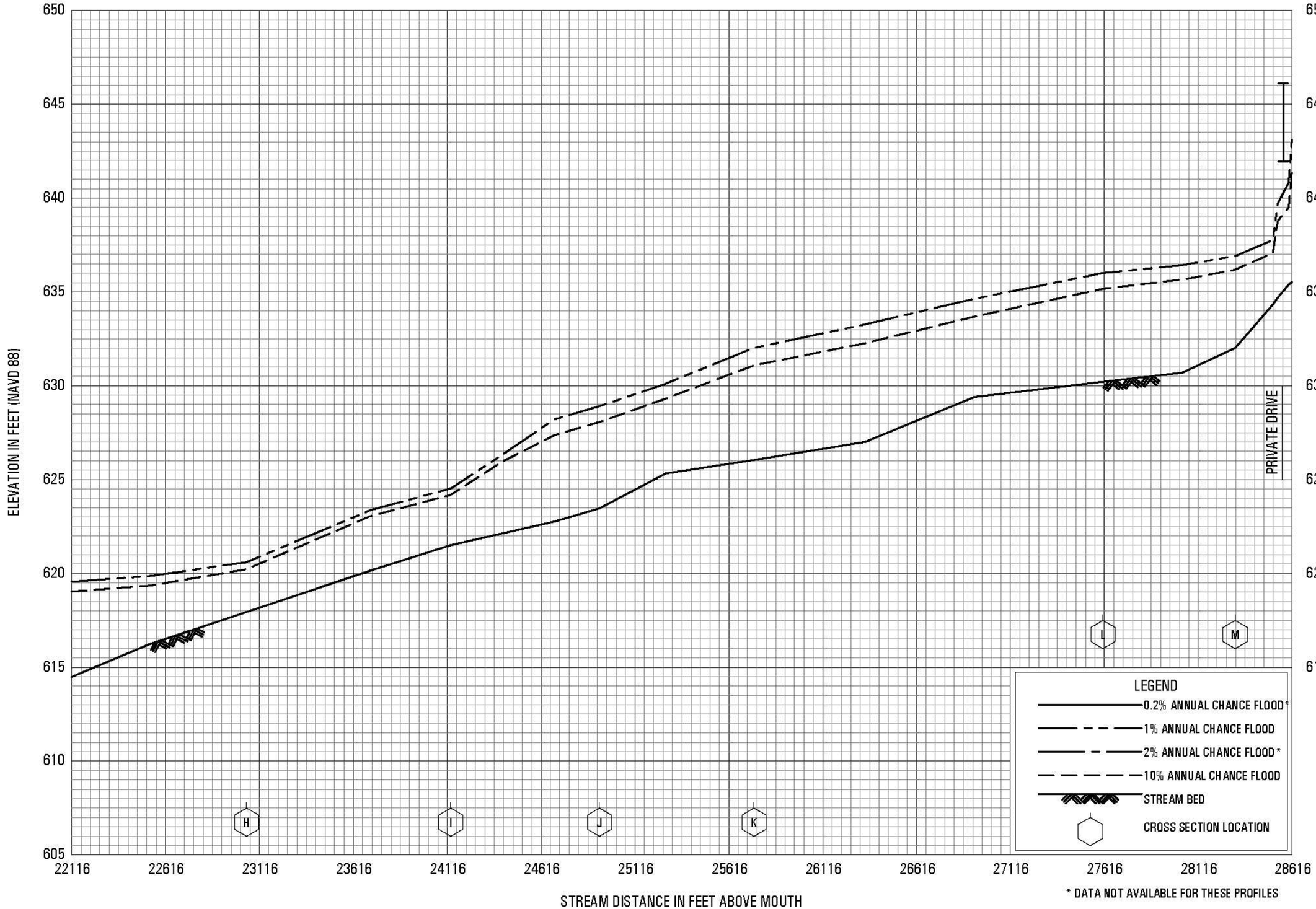
DUCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

05P



FLOOD PROFILES

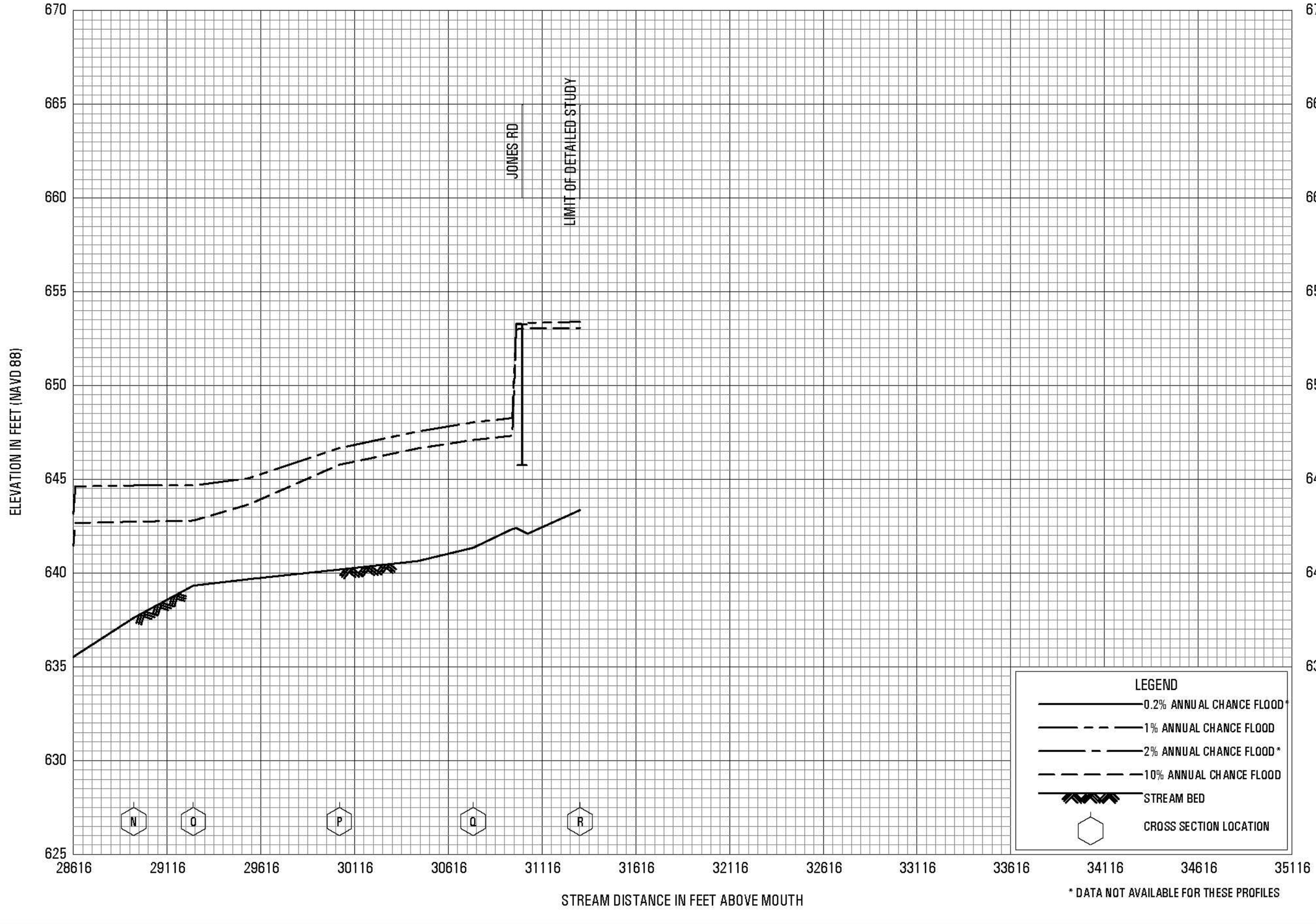
DUCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

06P



FLOOD PROFILES

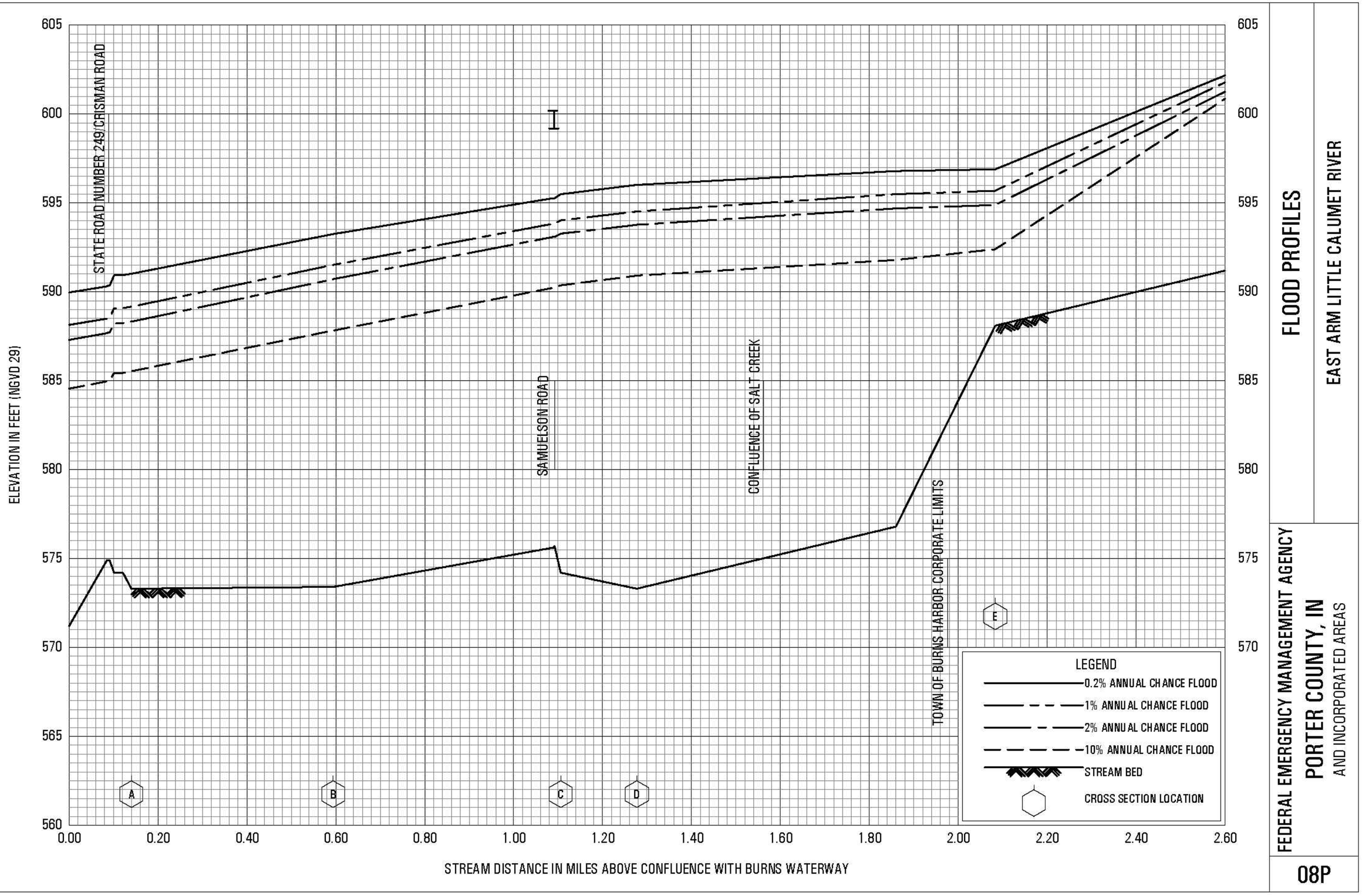
DUCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

07P



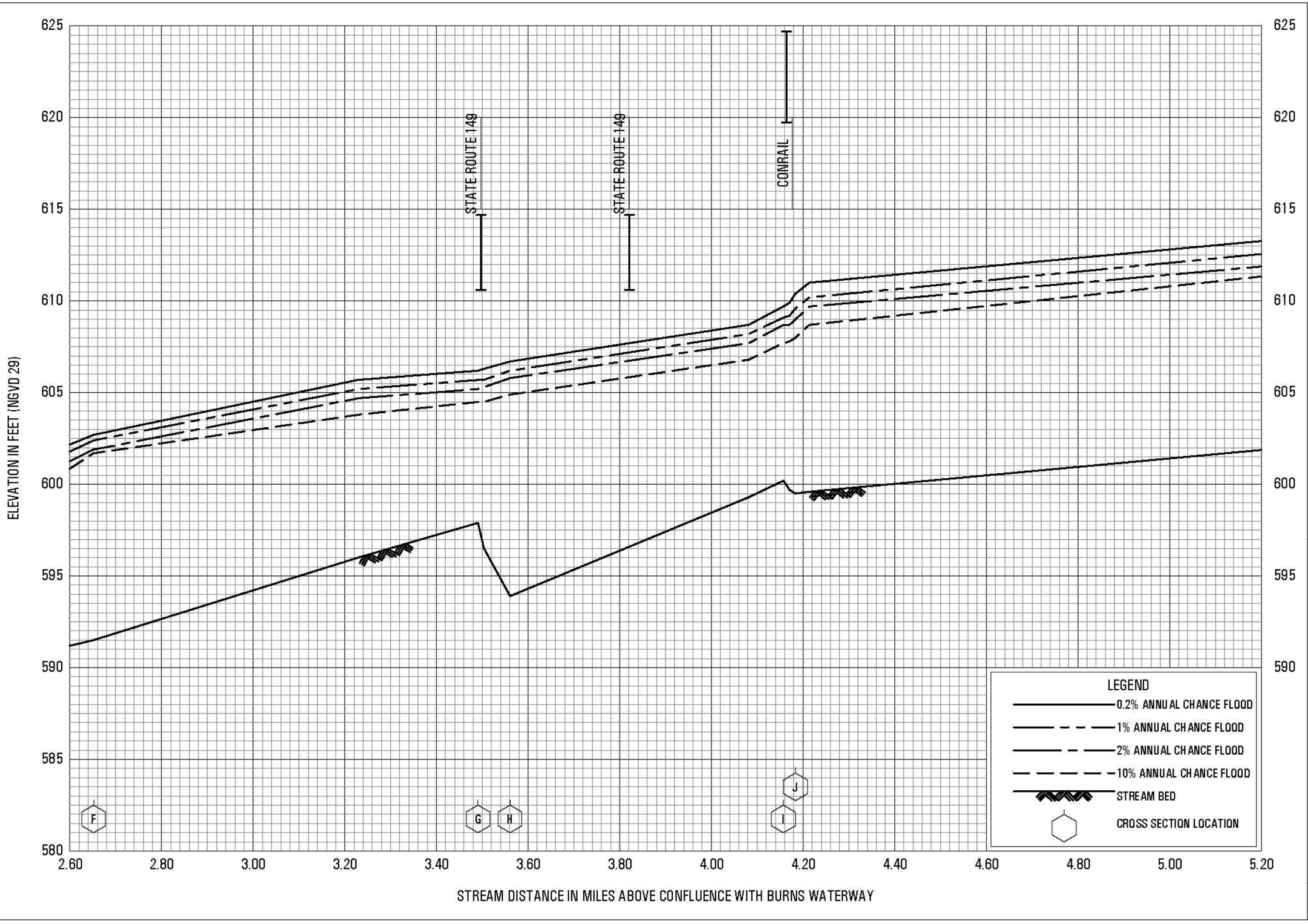
FLOOD PROFILES

EAST ARM LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

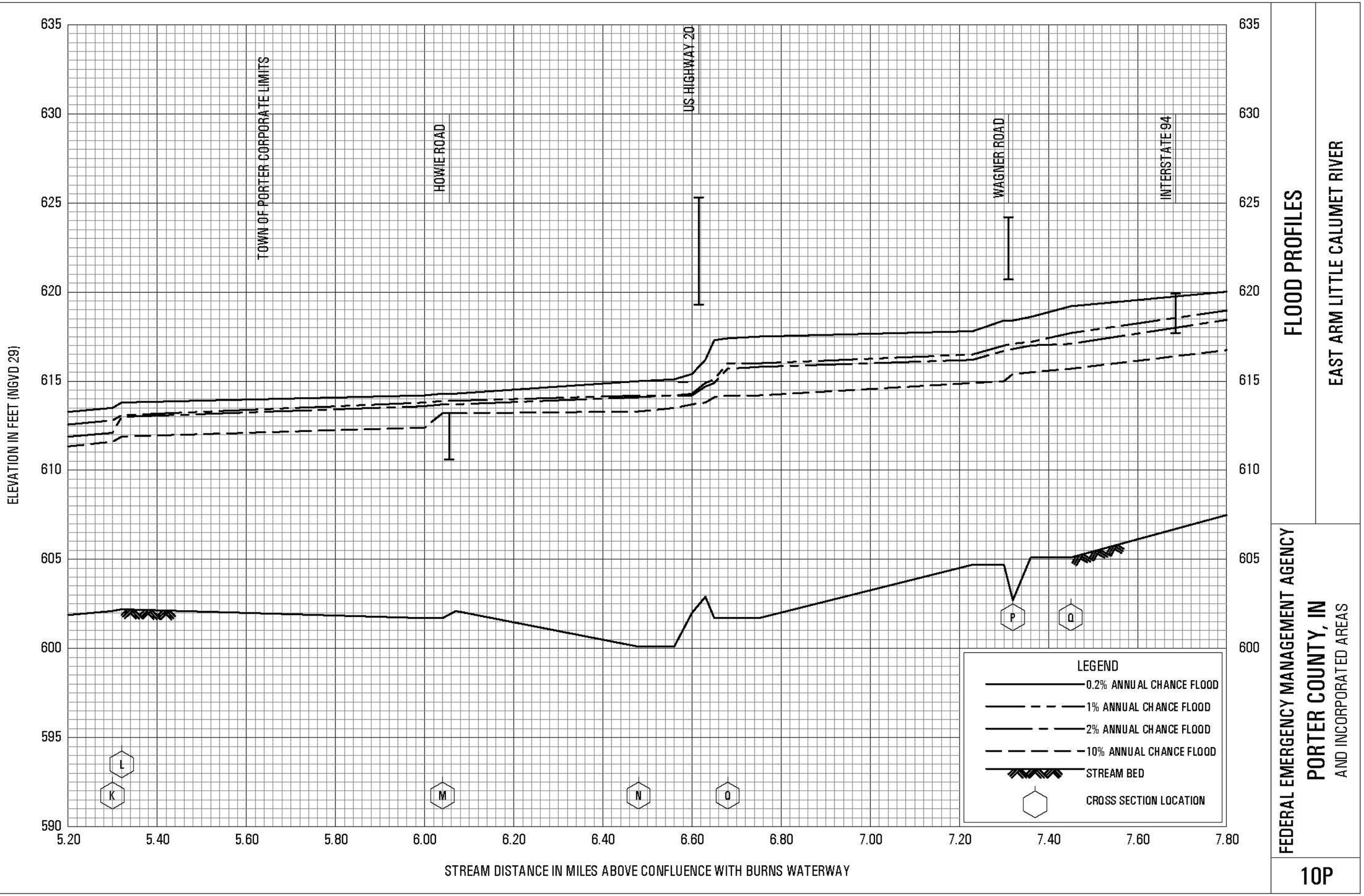
EAST ARM LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

09P



FLOOD PROFILES

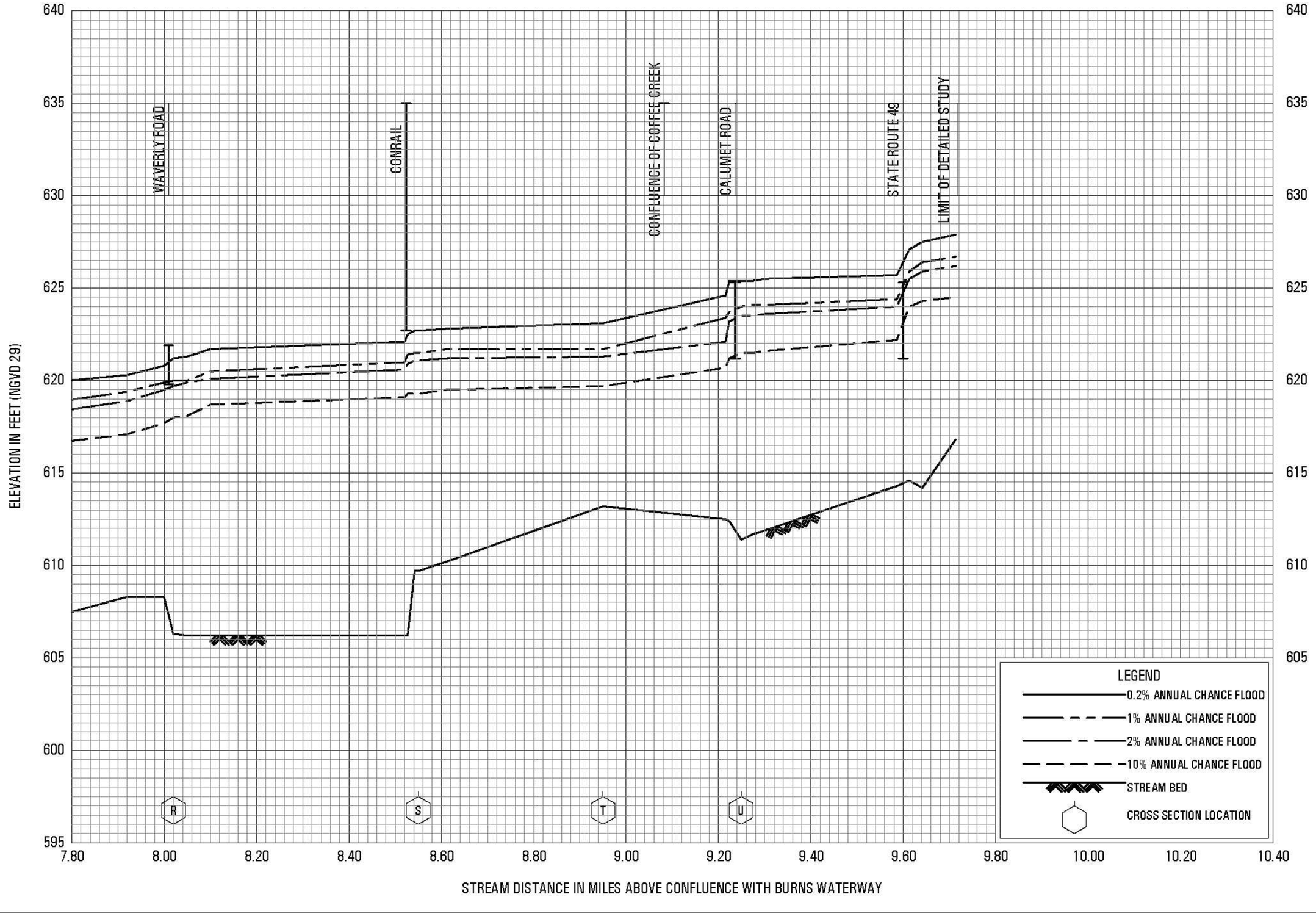
EAST ARM LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

10P



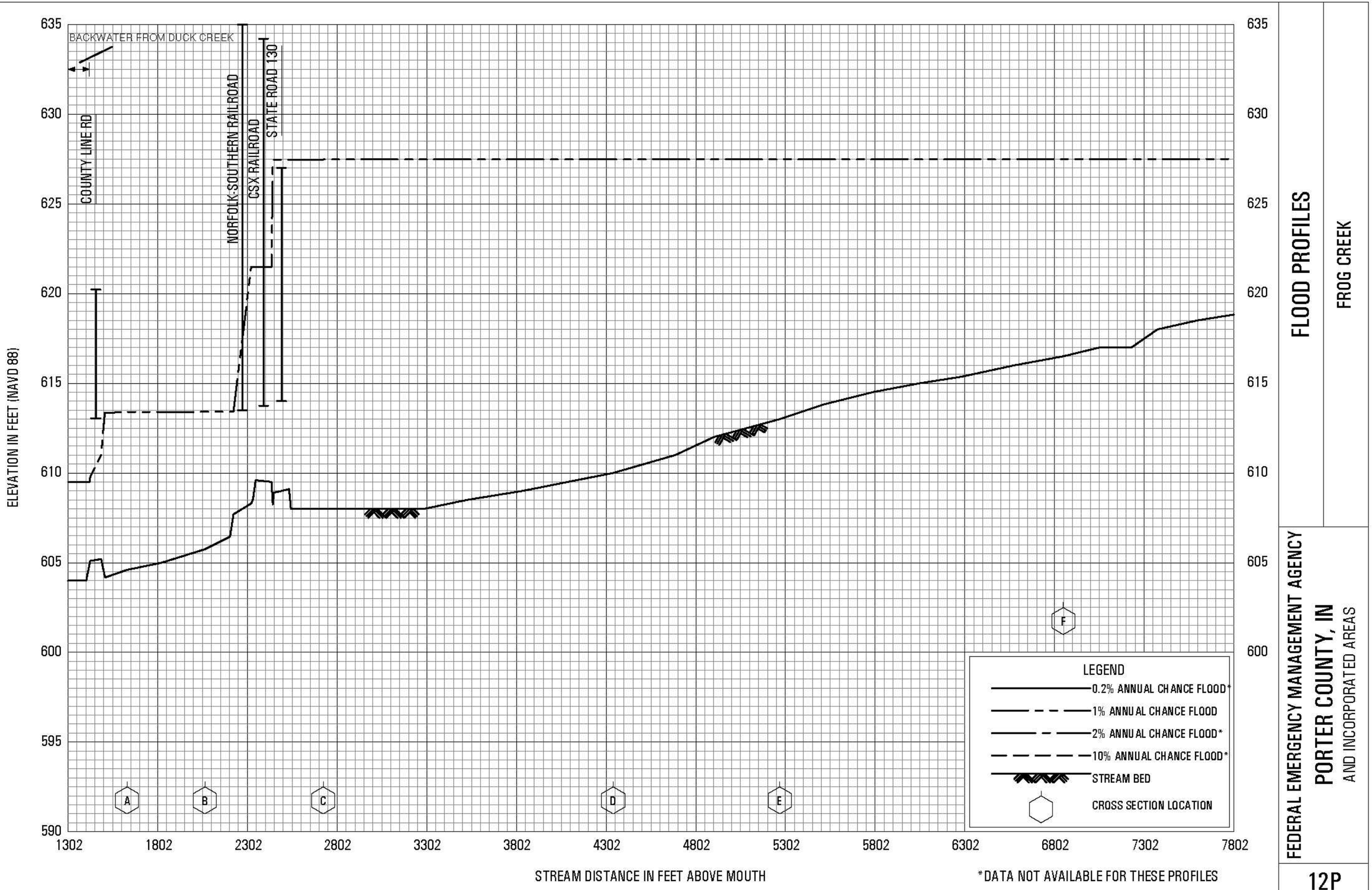
FLOOD PROFILES

EAST ARM LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



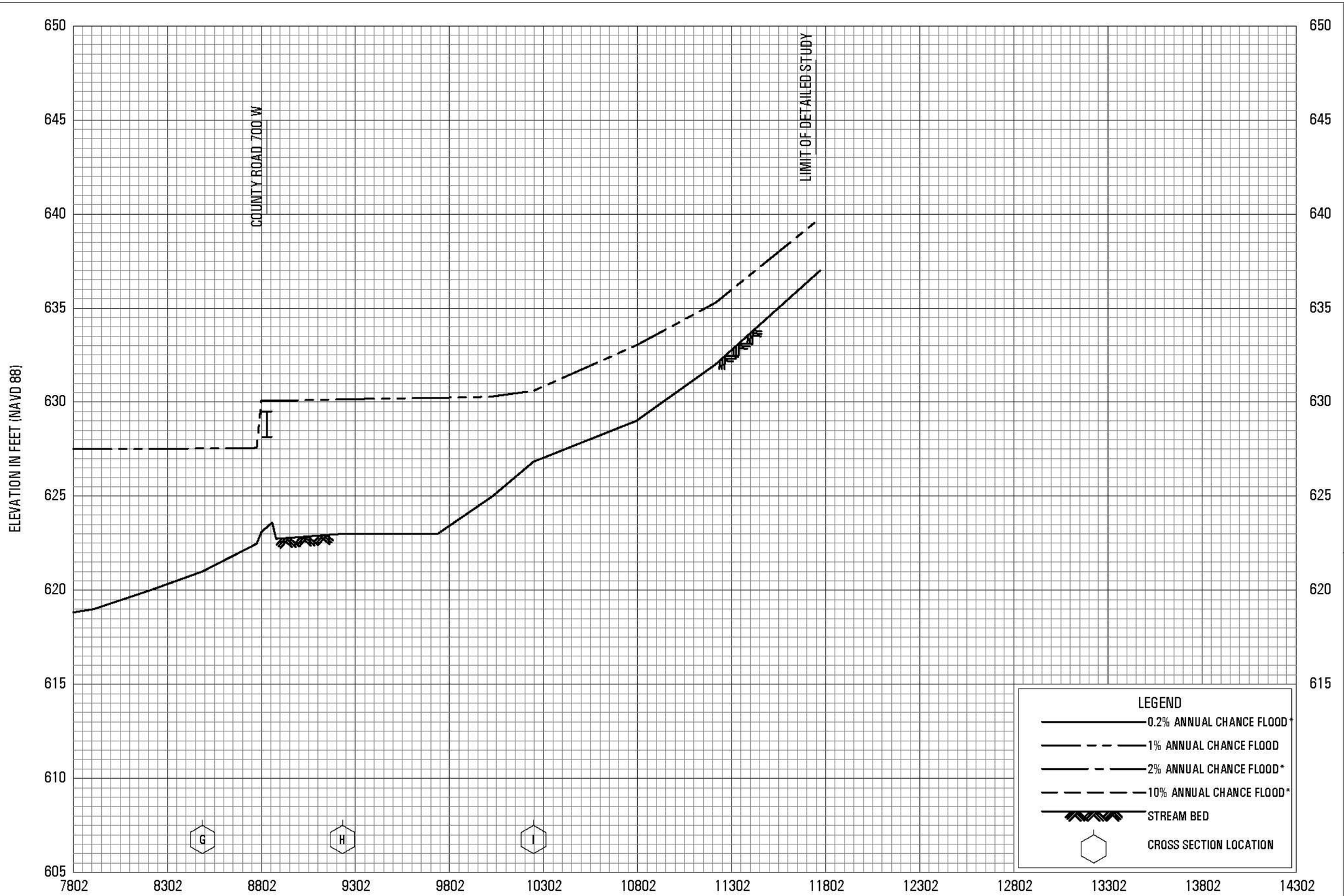
FLOOD PROFILES

FROG CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



*DATA NOT AVAILABLE FOR THESE PROFILES

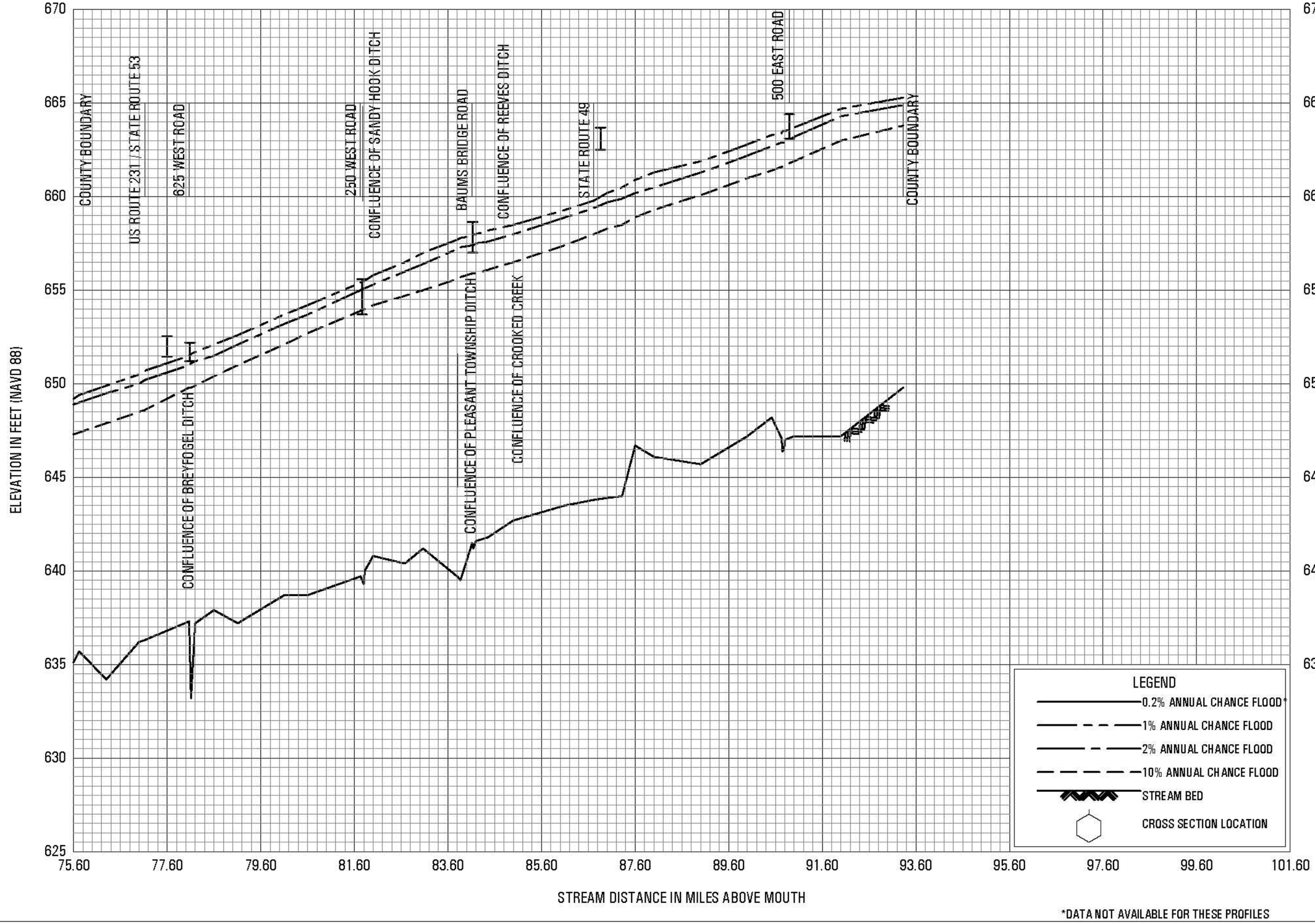
FLOOD PROFILES

FROG CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



*DATA NOT AVAILABLE FOR THESE PROFILES

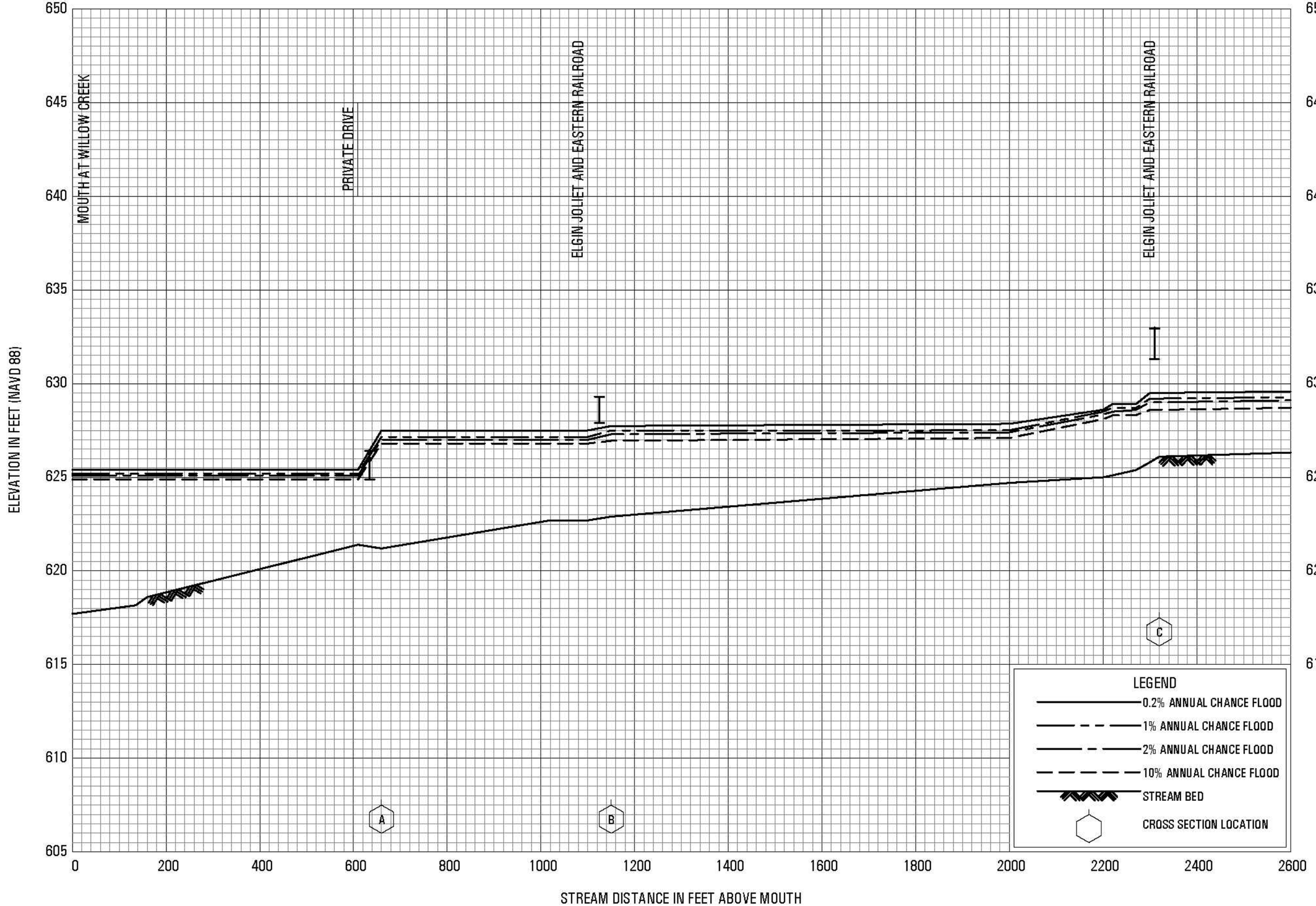
FLOOD PROFILES

KANKAKEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

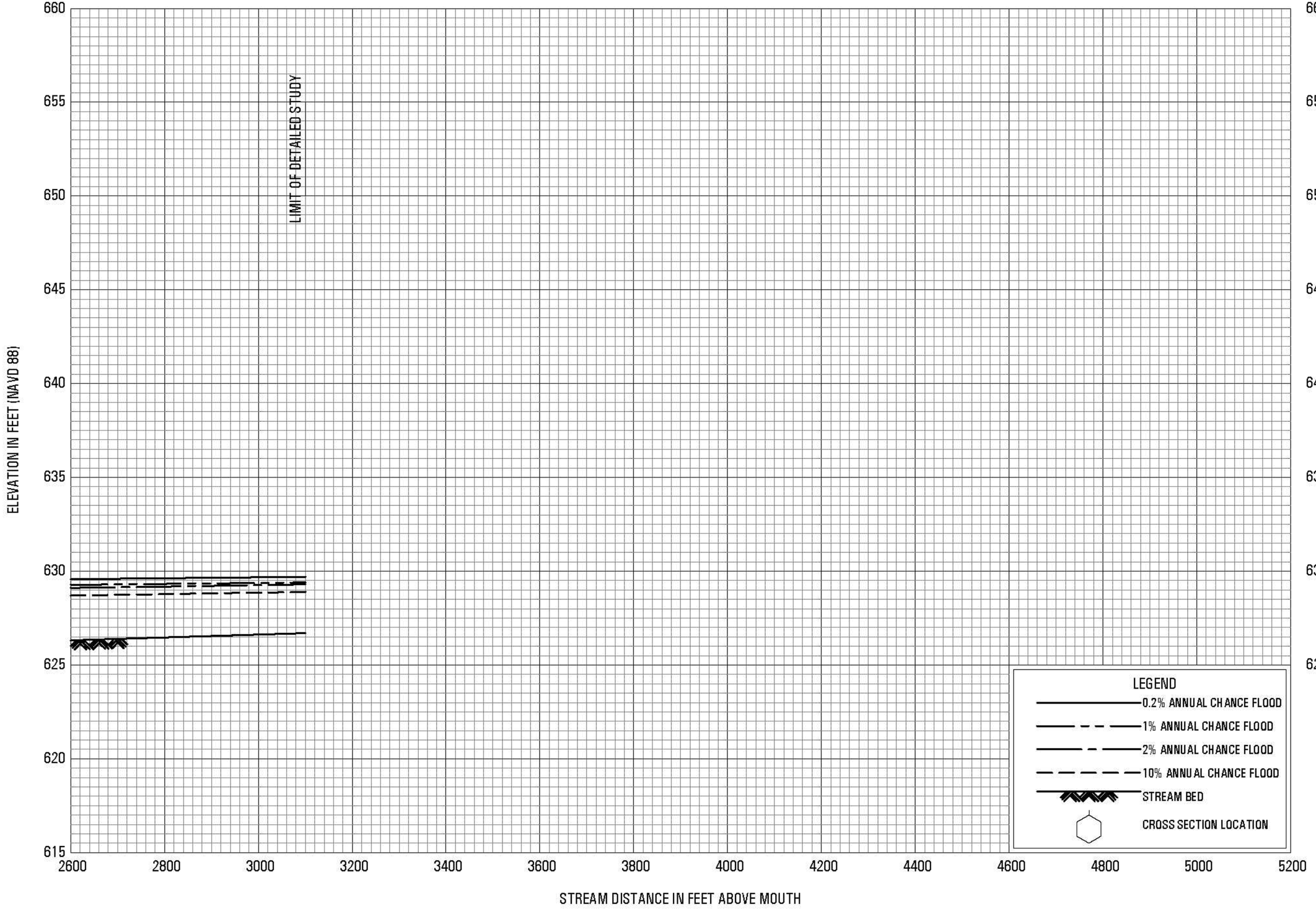
LENBURG DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

15P



FLOOD PROFILES

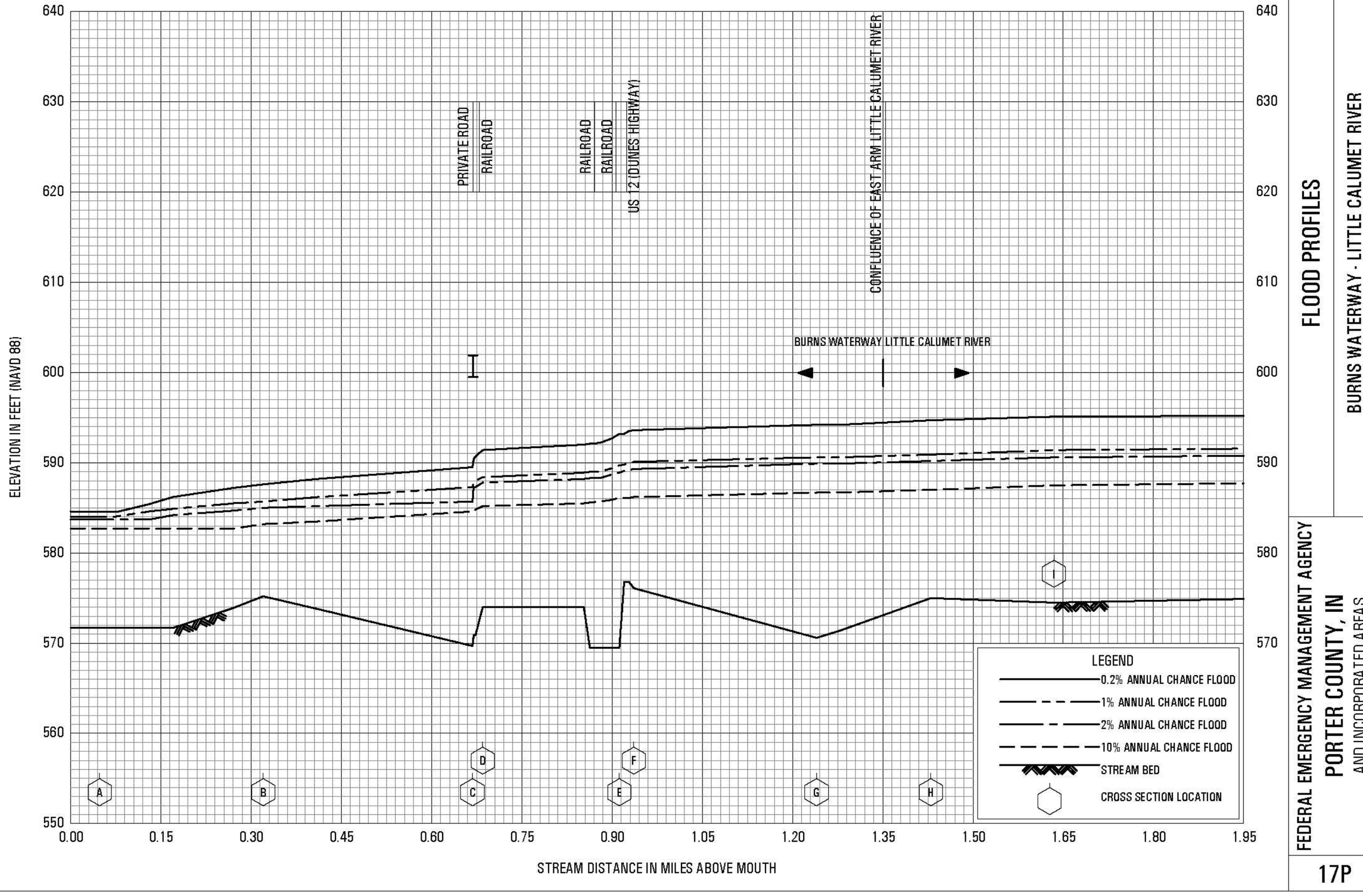
LENBURG DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

16P



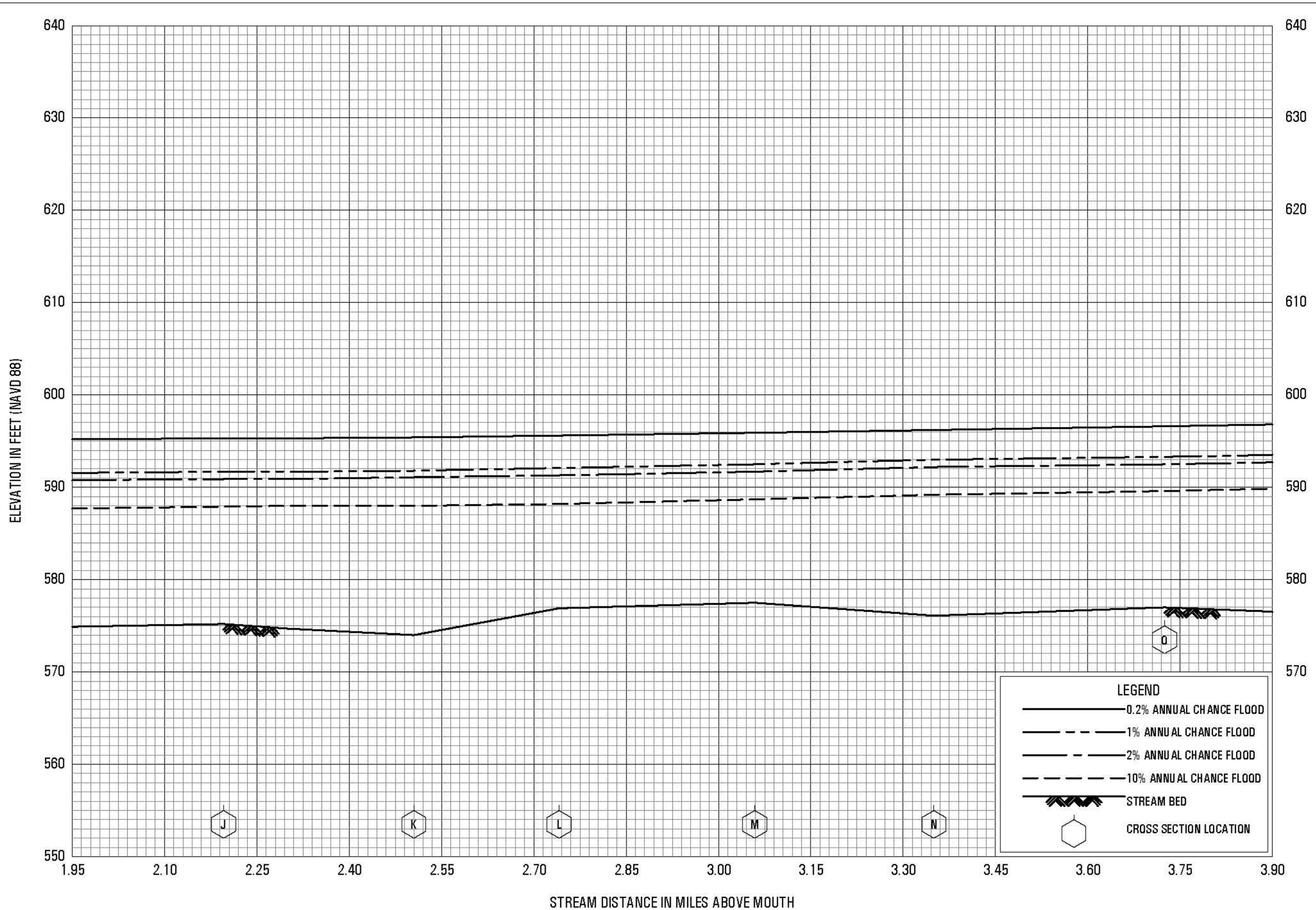
FLOOD PROFILES

BURNS WATERWAY - LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

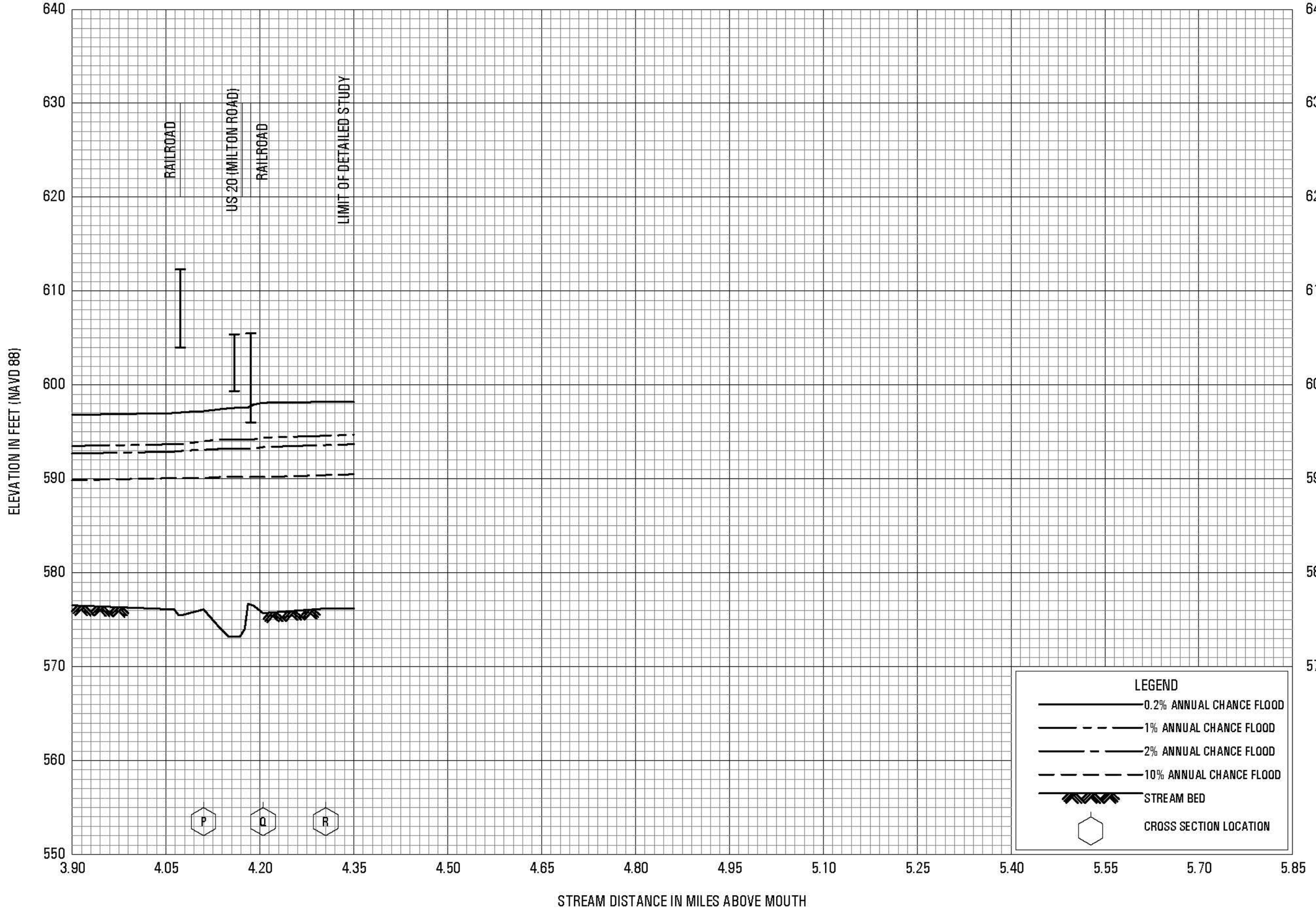
LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

18P



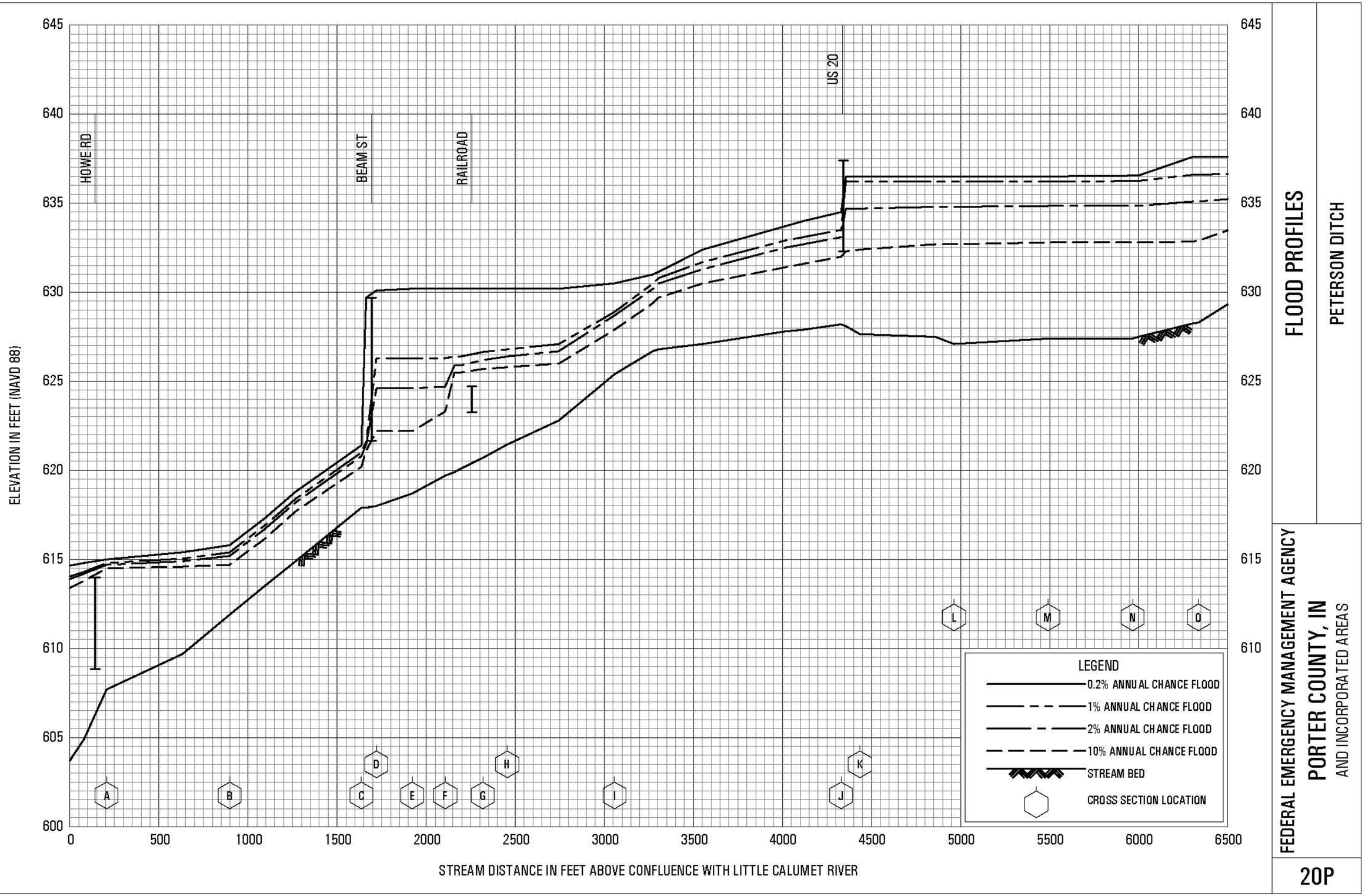
FLOOD PROFILES

LITTLE CALUMET RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

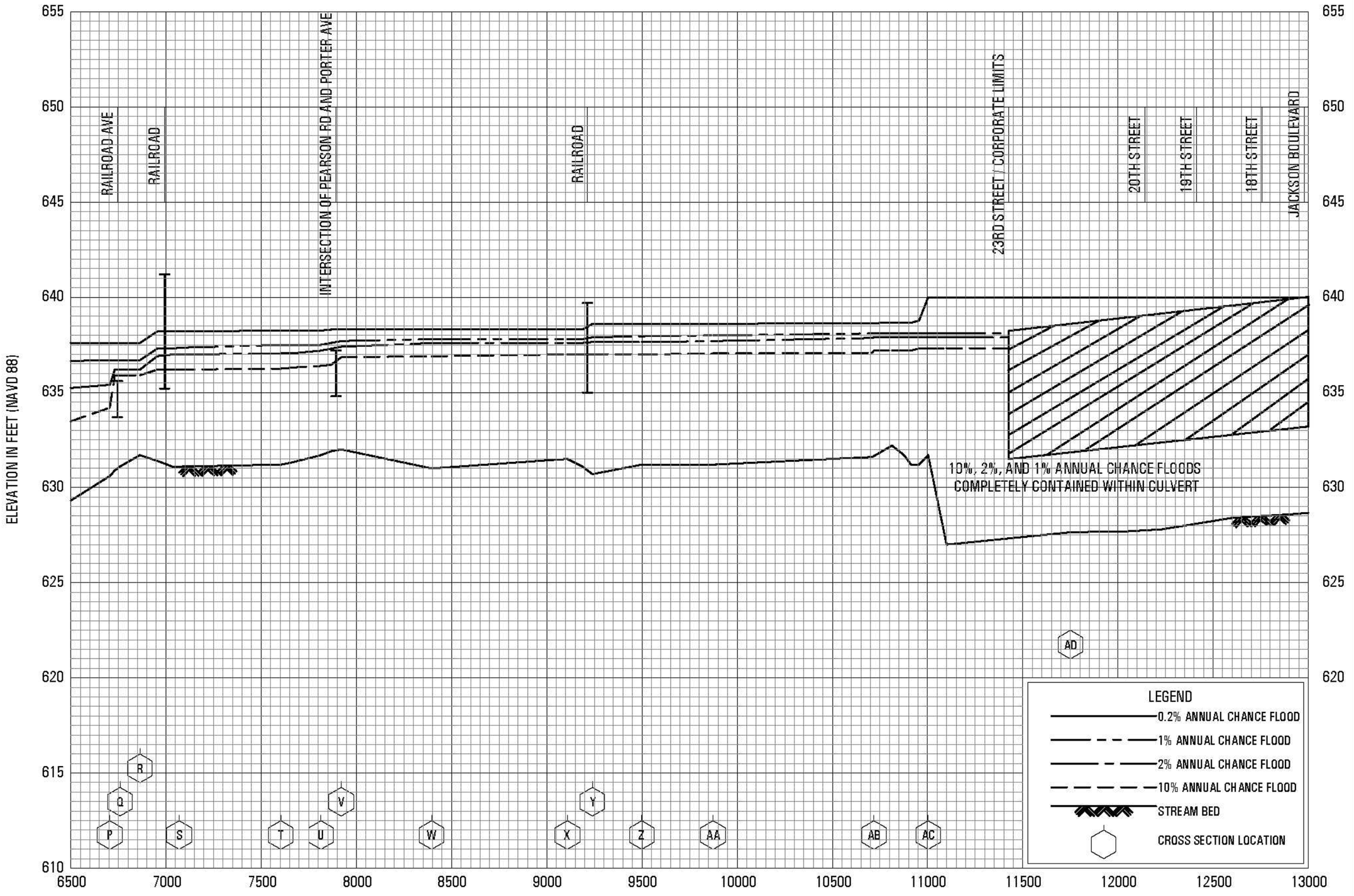
PETERSON DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

20P



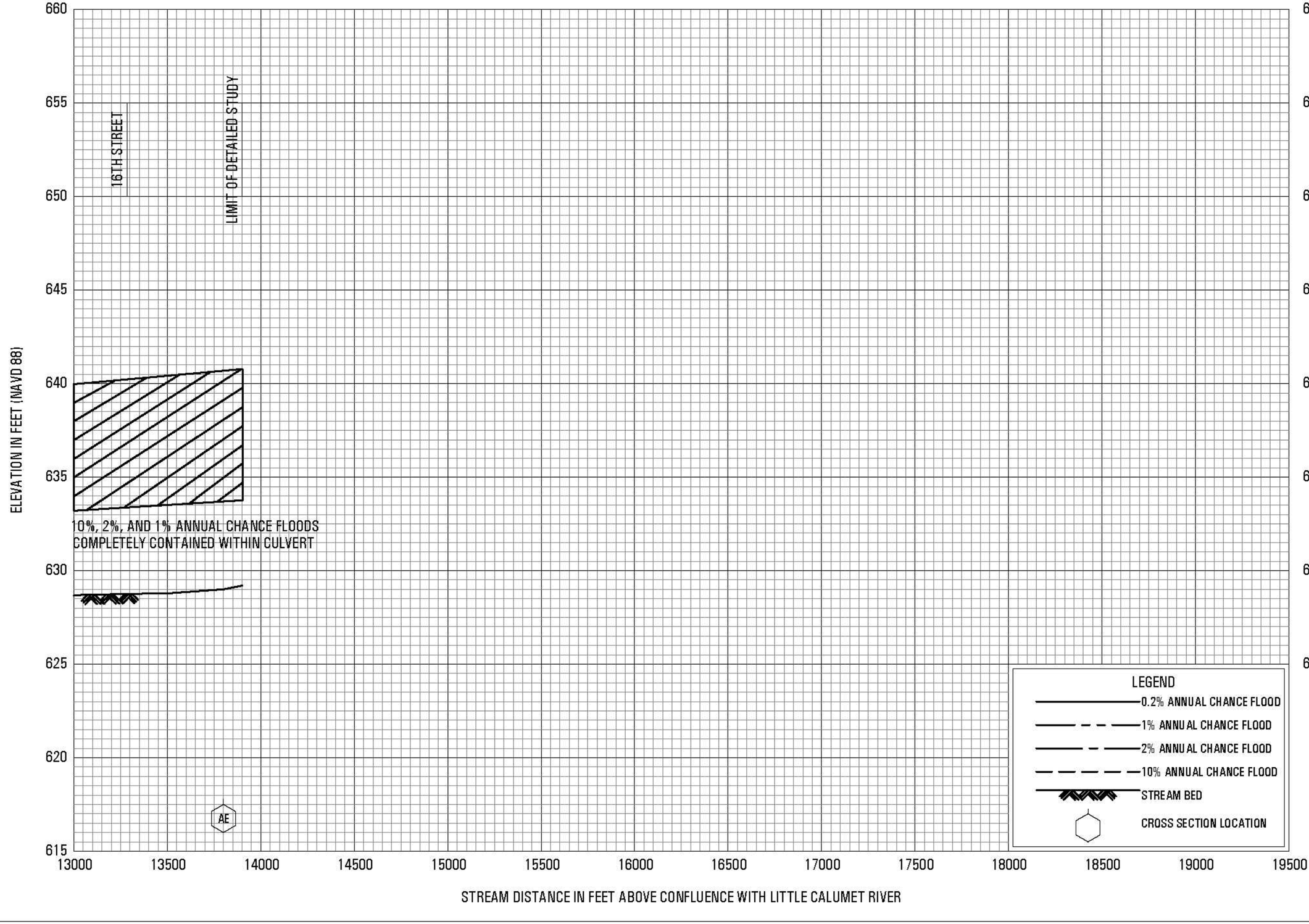
FLOOD PROFILES

PETERSON DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

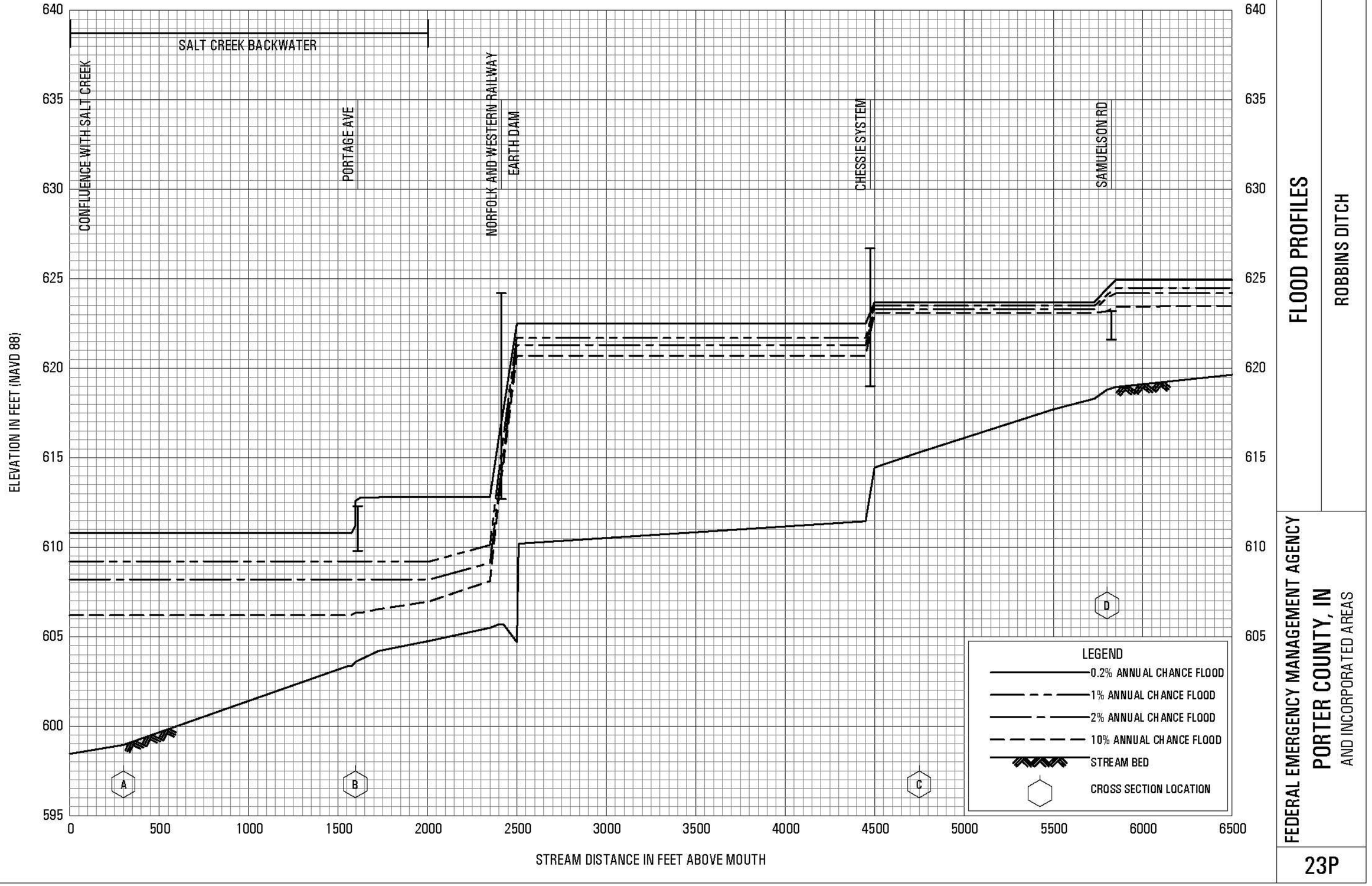
PETERSON DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

22P



FLOOD PROFILES

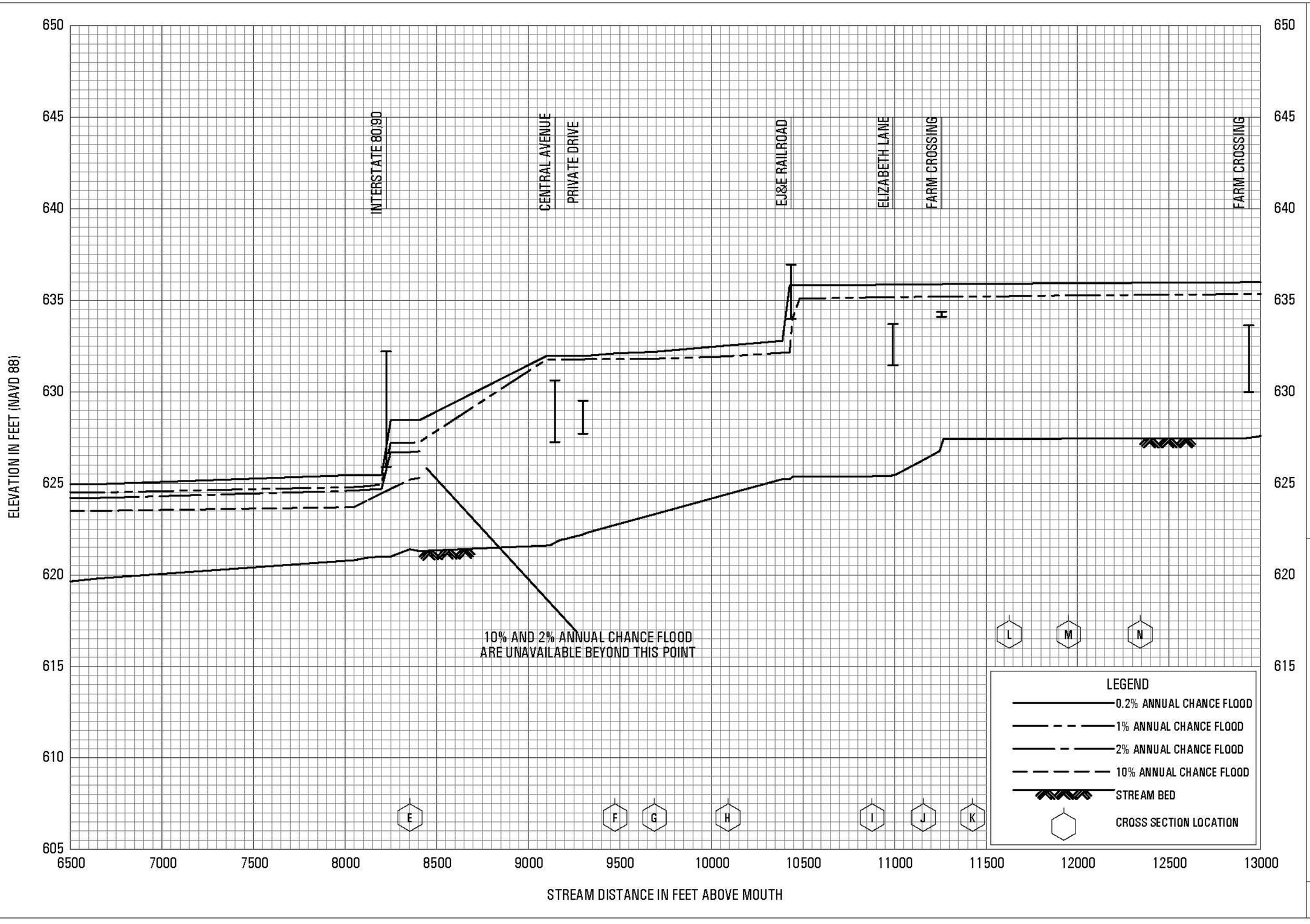
ROBBINS DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

23P



FLOOD PROFILES

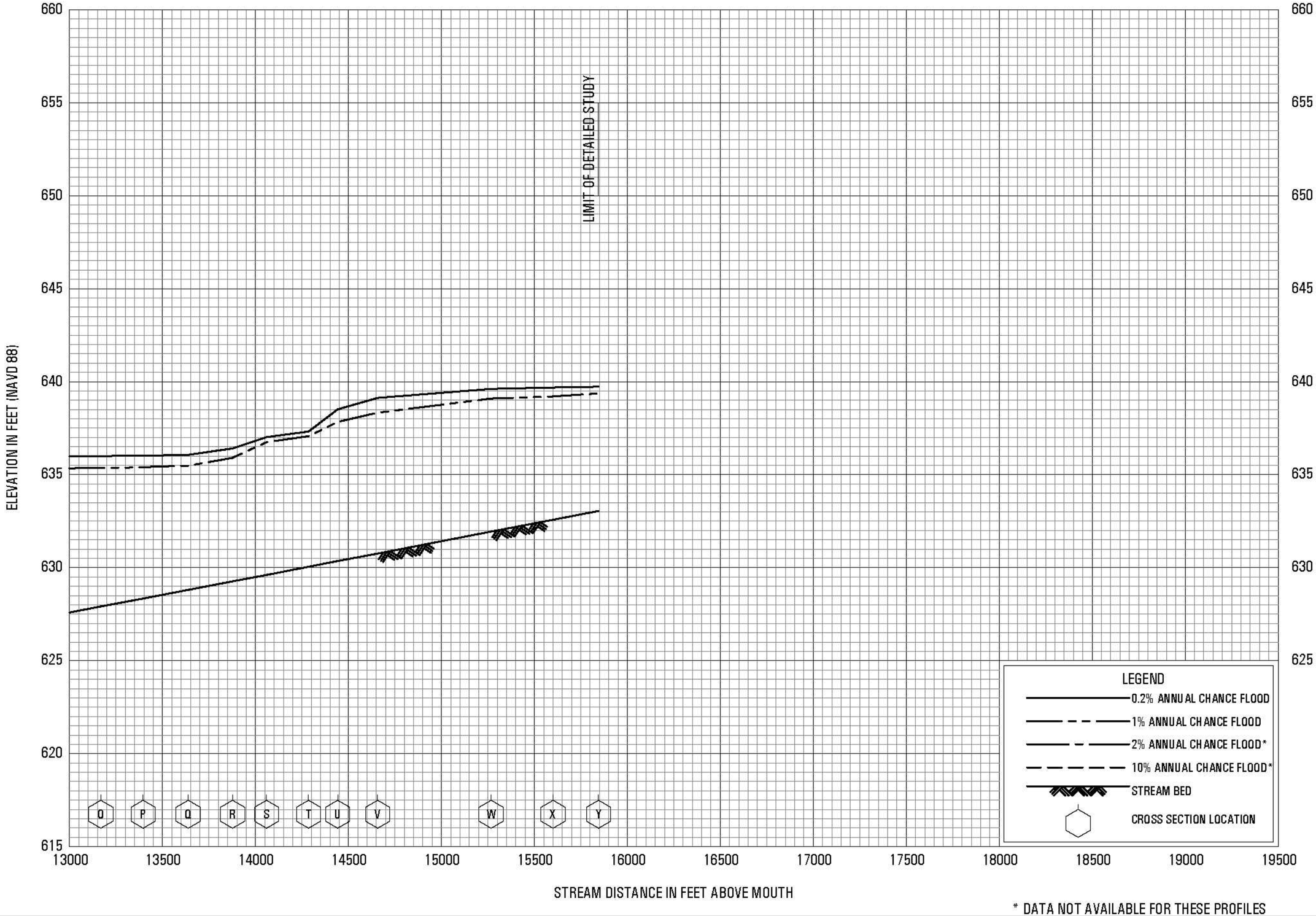
ROBBINS DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

24P



* DATA NOT AVAILABLE FOR THESE PROFILES

FLOOD PROFILES

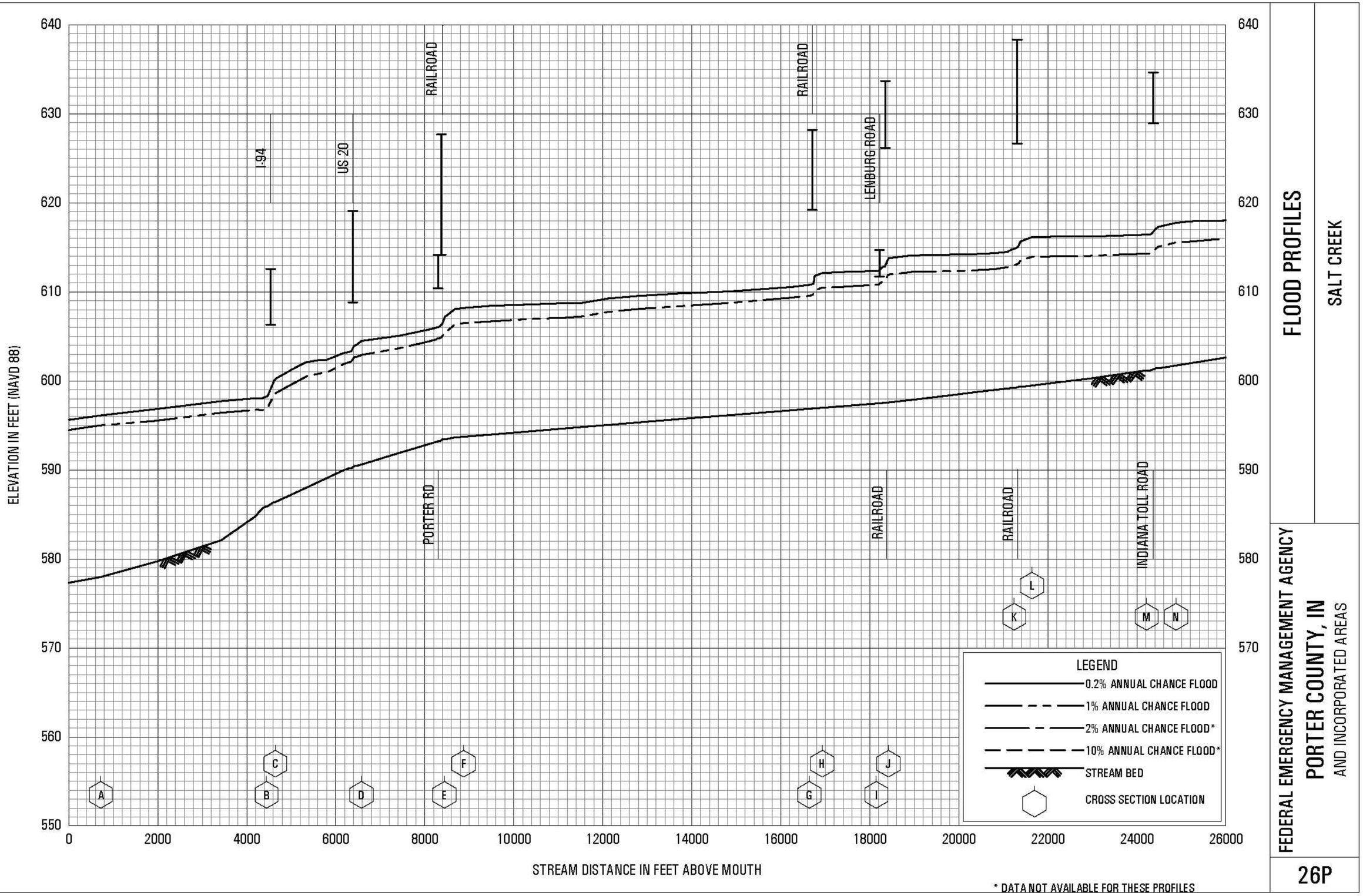
ROBBINS DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

25P



* DATA NOT AVAILABLE FOR THESE PROFILES

FLOOD PROFILES

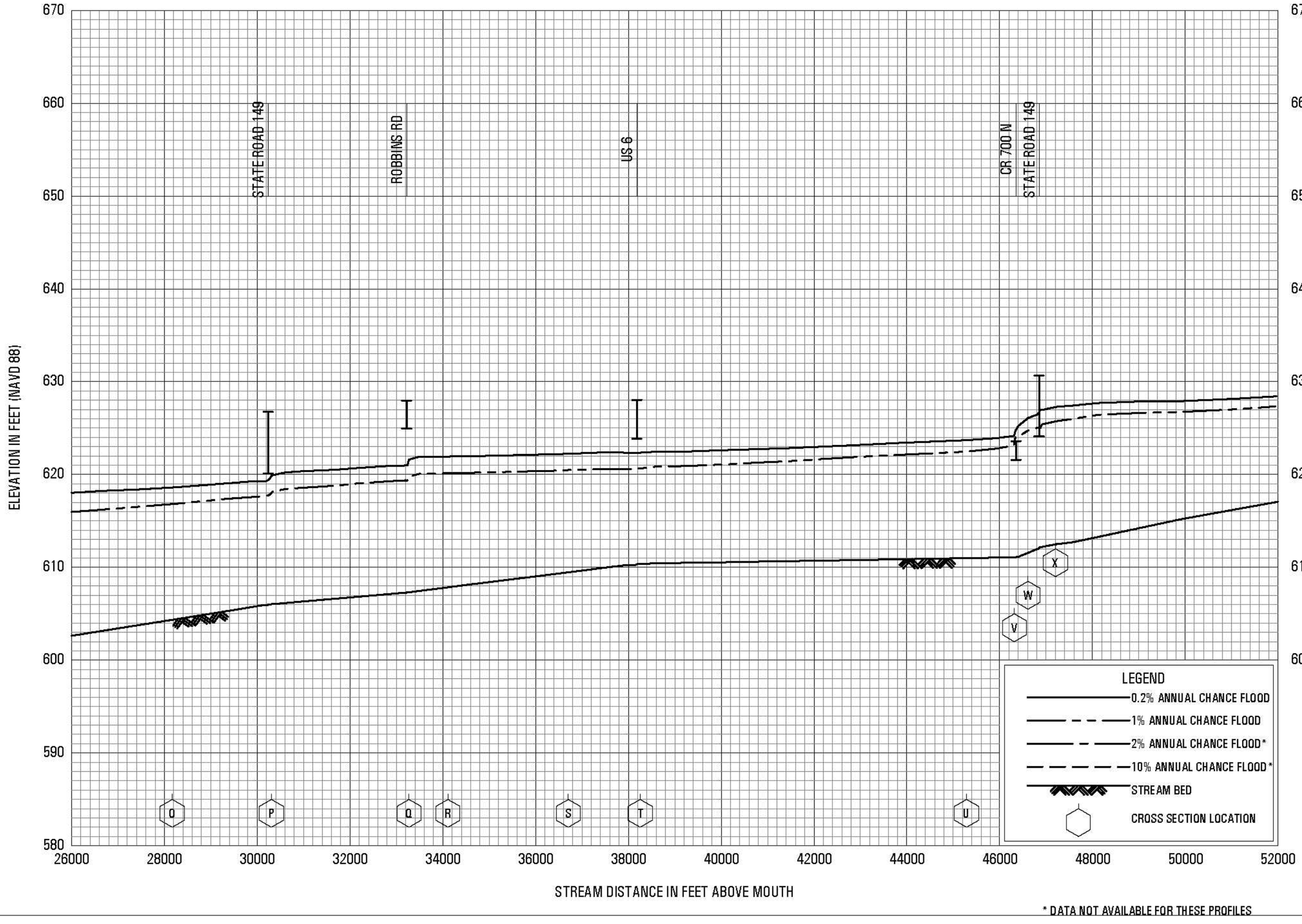
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

26P



* DATA NOT AVAILABLE FOR THESE PROFILES

FLOOD PROFILES

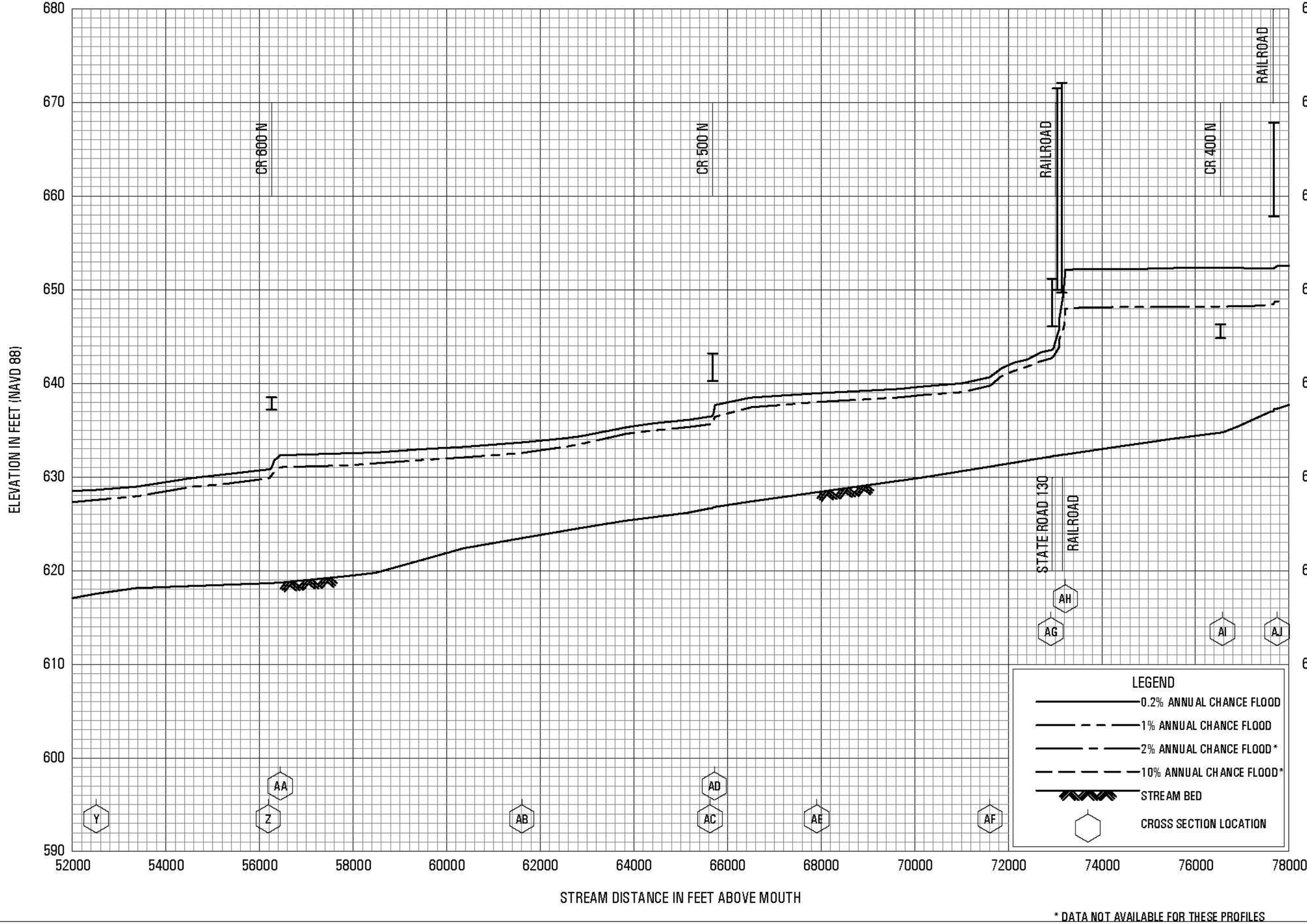
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

27P



* DATA NOT AVAILABLE FOR THESE PROFILES

FLOOD PROFILES

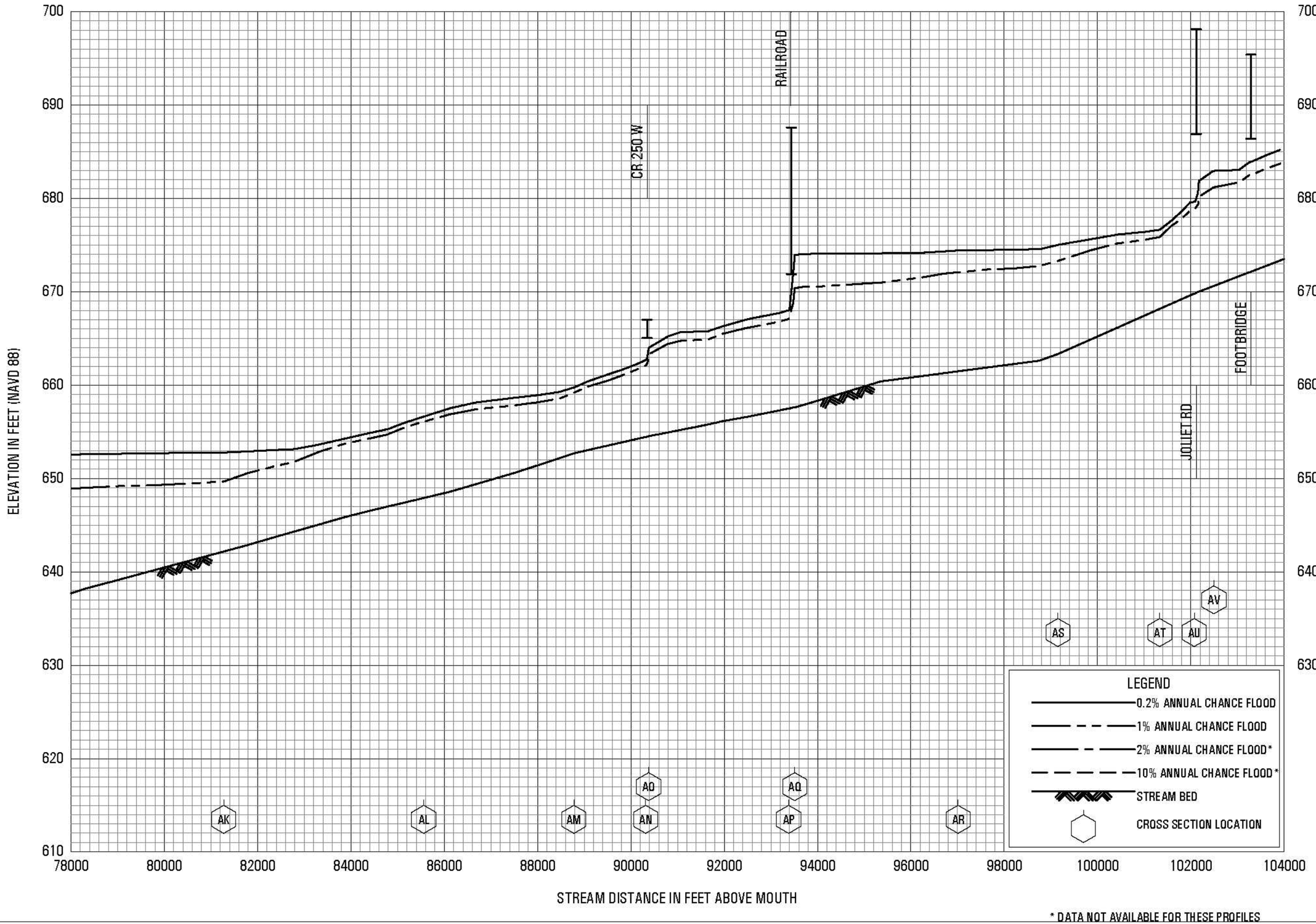
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

28P



* DATA NOT AVAILABLE FOR THESE PROFILES

FLOOD PROFILES

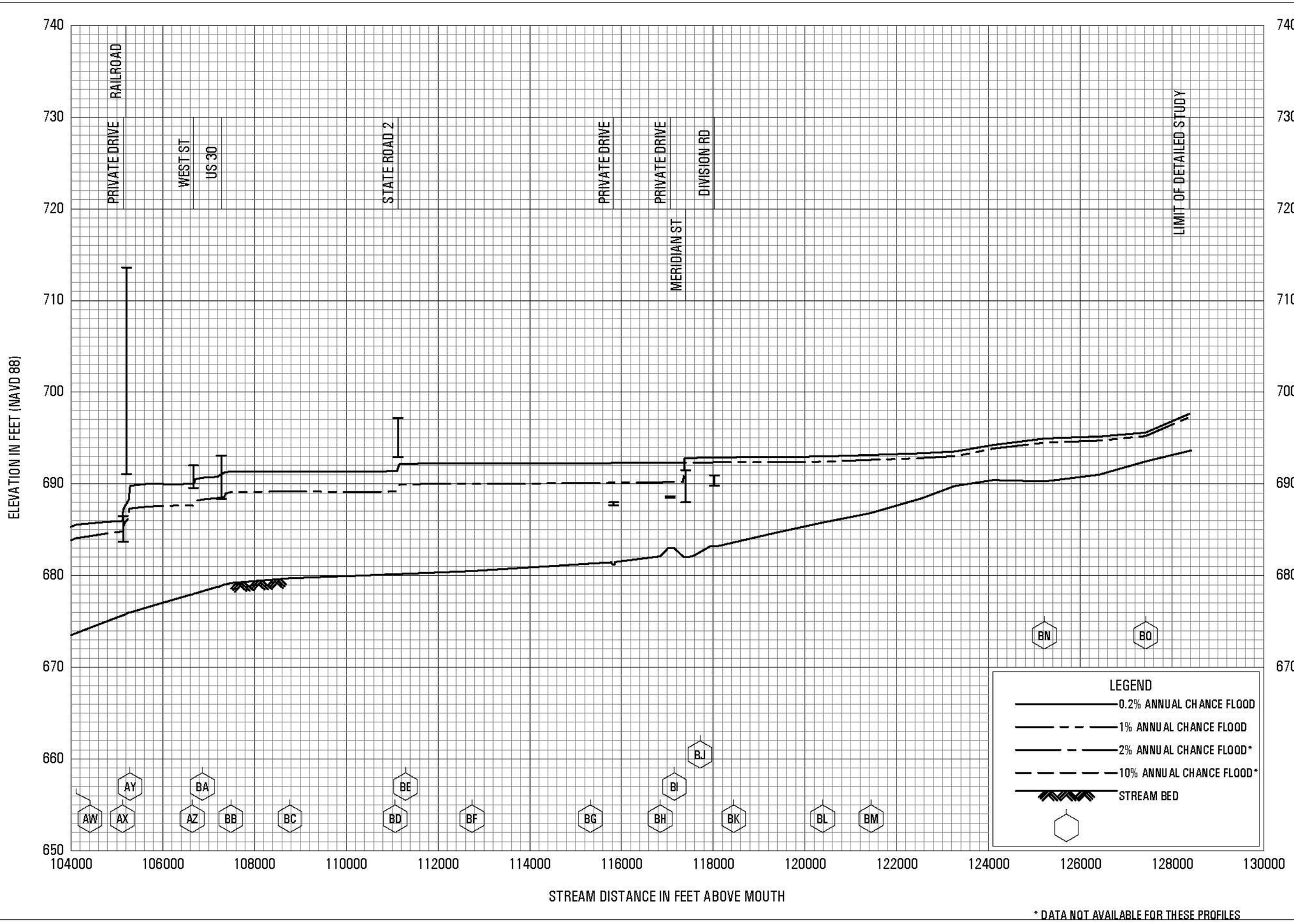
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

29P



* DATA NOT AVAILABLE FOR THESE PROFILES

FLOOD PROFILES

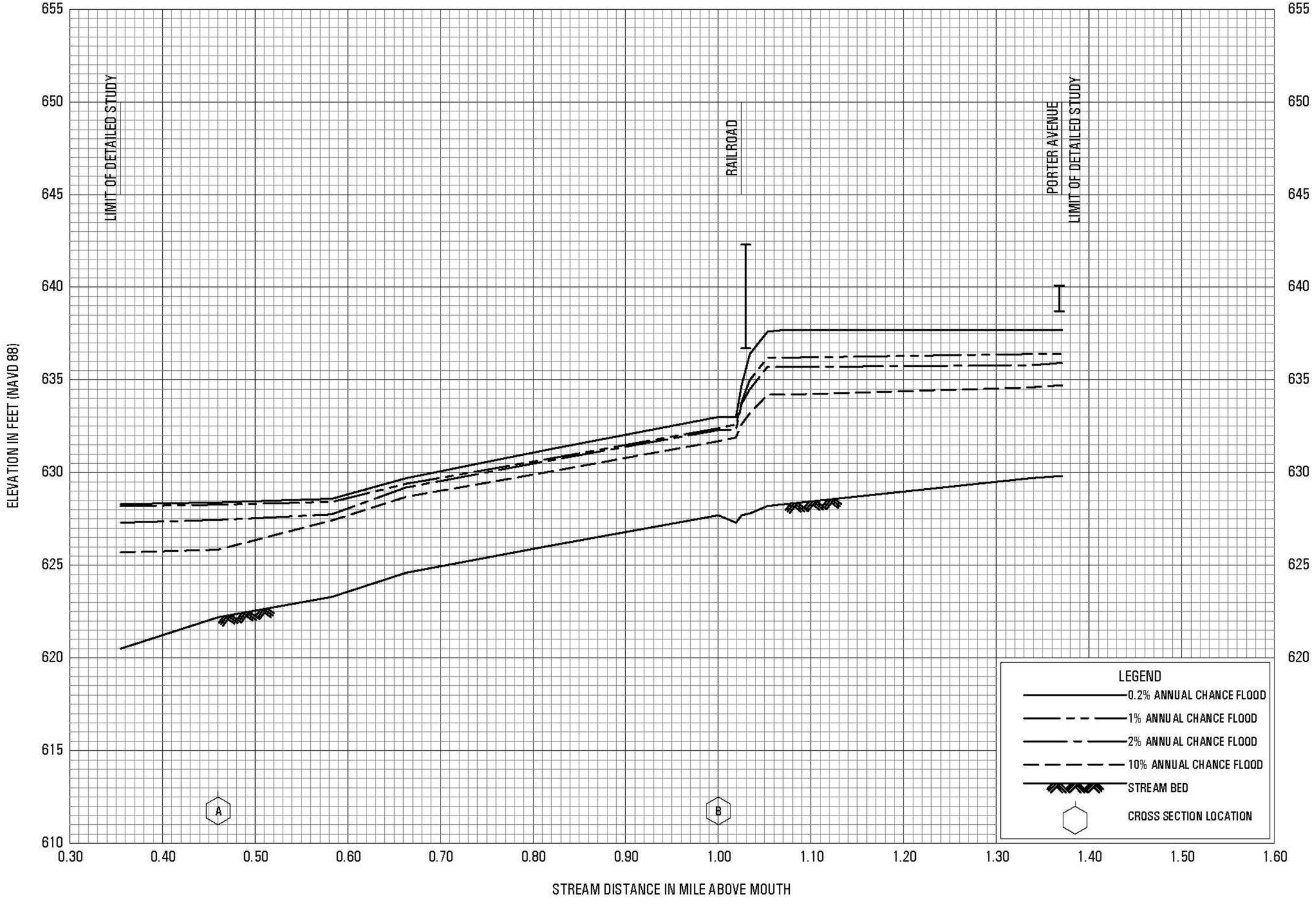
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

30P



FLOOD PROFILES

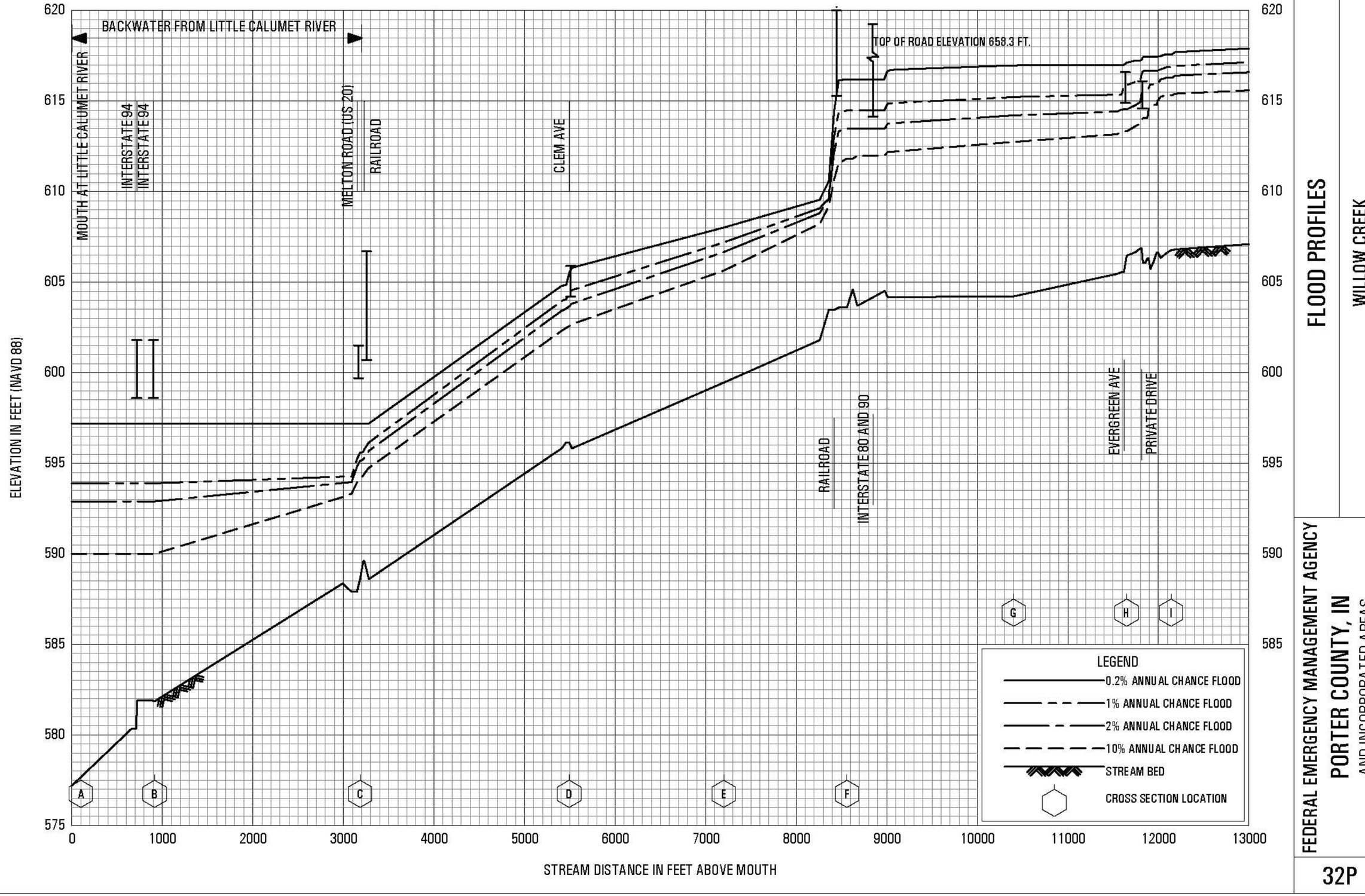
SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS

31P



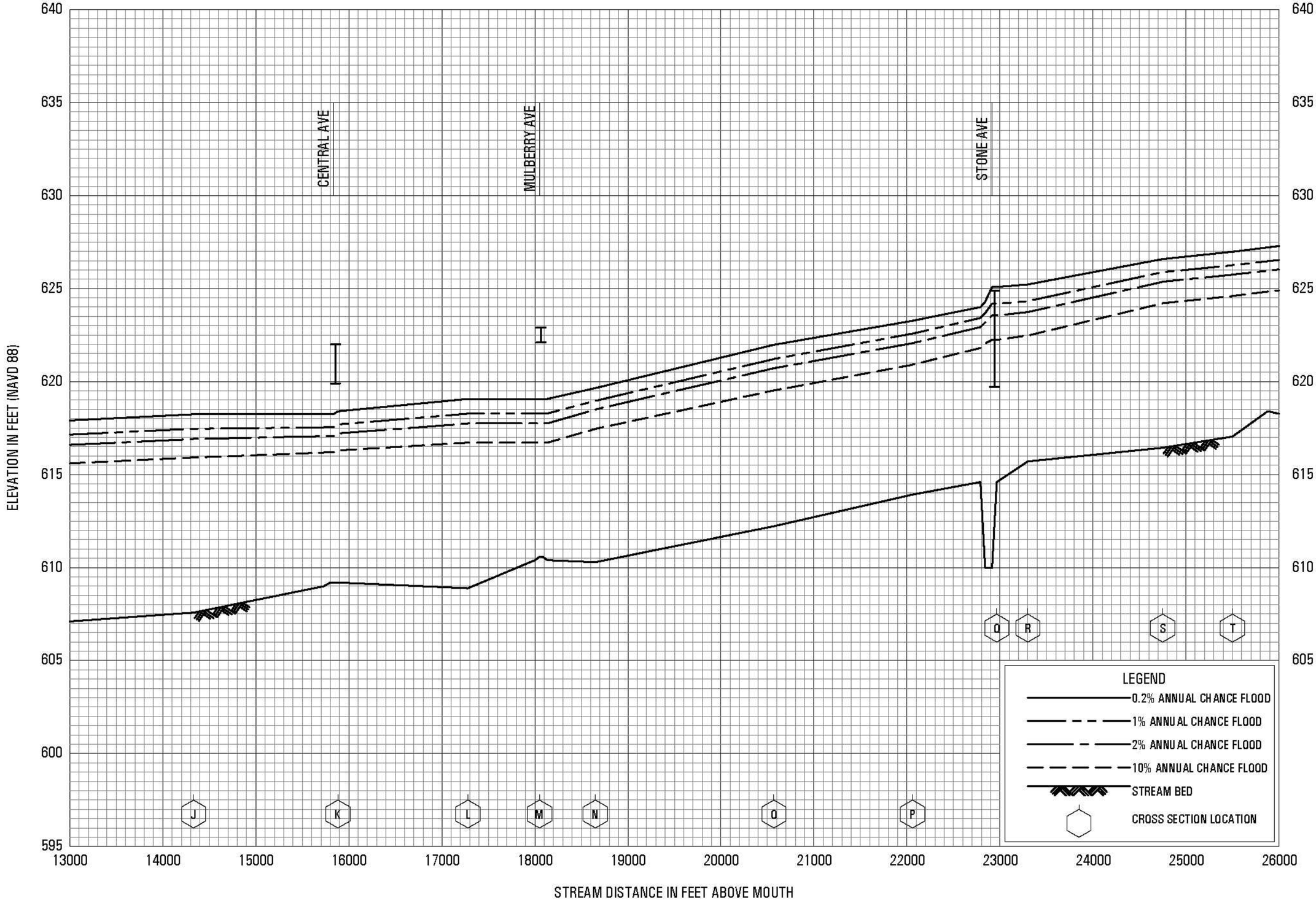
FLOOD PROFILES

WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



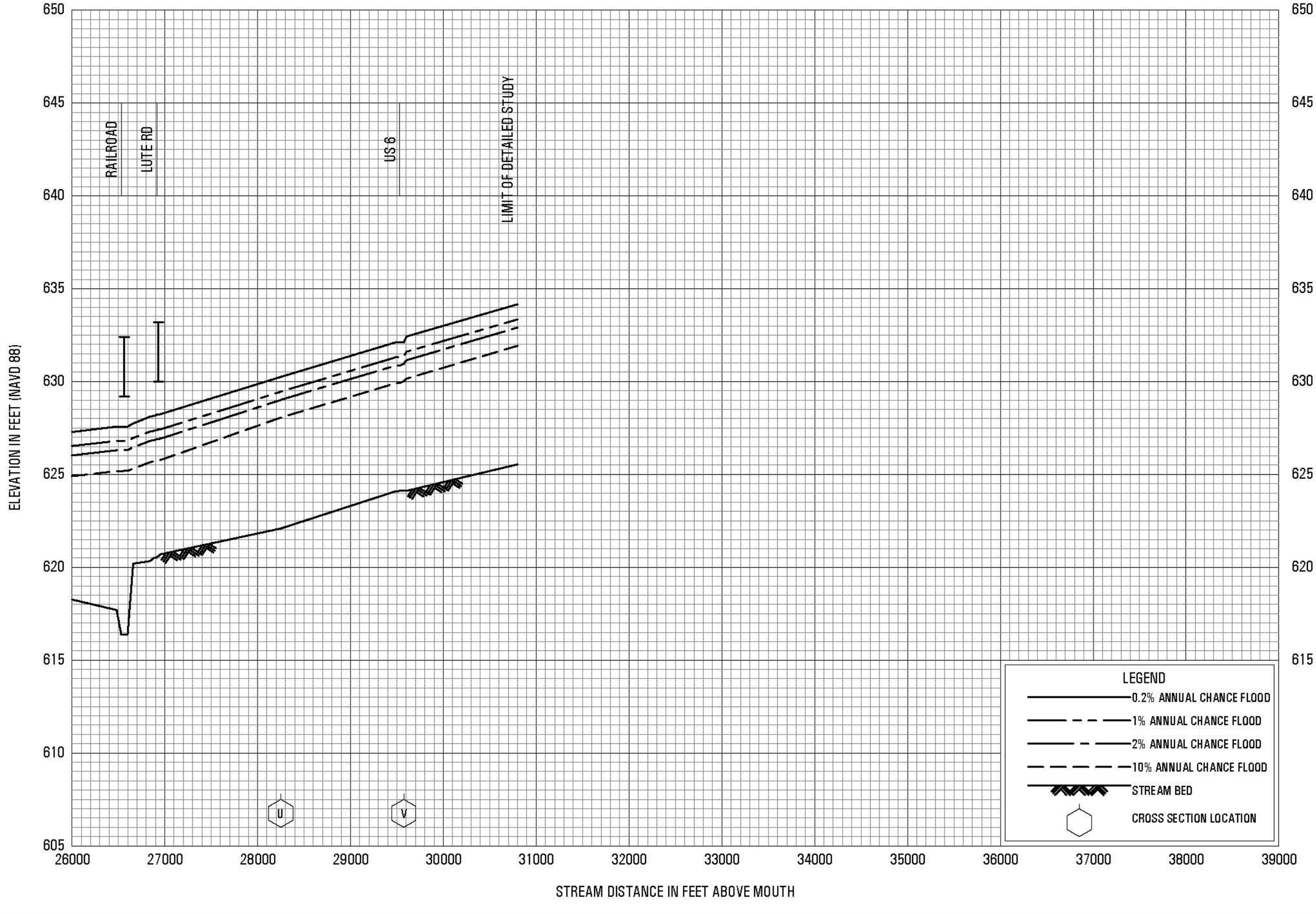
FLOOD PROFILES

WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PORTER COUNTY, IN

AND INCORPORATED AREAS